DETERMINANTS OF FINANCIAL MARKET DEVELOPMENT: THE ROLE OF INSTITUTIONS

BY

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Determinants of Financial Market Development: The Role of Institutions

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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Abstract

This study aims to determine the main drivers of financial market development, with a specific interest in the relationship between the stock and bank credit markets, as proxies of financial market development, and the role of institutional quality, in ten African countries for the period of 2009 to 2017. A number of econometric techniques such as the General Methods of Moments (GMM) model for dynamic panel data, autoregressive distribution lag (ARDL) bound testing approach to cointegration, vector error correction model (VECM), and granger causality tests were applied in the study. We further developed a composite index for both financial market development and institutional quality using Principal Components Analysis (PCA). The results demonstrate that institutional quality, as well as infrastructure development, economic growth, and inflation are the main determinants of financial market development in our sample of ten African countries. Findings from the ARDL bound testing approach confirm the existence of a long-run association between institutional quality and financial market development. Although financial market development has no effect on economic growth, institutional quality was found to have a positive and highly significant effect on economic growth. Furthermore, employing the Granger causality test, we found uni-directional granger causality between financial market development and institutional quality, implying that financial market development is a significant causal factor for institutional quality. In consideration of these findings, policy formulation by governments should be designed towards enhancing financial and institutional quality development, and this can be possibly achieved by effective enforcement of law to encourage compliance, while simultaneously eliminating corruption and other institutional hindrances to development.

KEYWORDS: Financial market development, institutional quality, economic growth, principal components analysis, granger causality

Ngamafuphi

Lolu cwaningo luhlose ukuveza izinhlaka ezingabaphembeleli abasemqoka ekuthuthukisweni kwezimakethe zezimali, kugxilwe kakhulu kubudlelwano obuphakathi kwesitoko kanye nezimakethe zamabhangi ahlinzekana ngezikweletu, njengabancedisi abathuthukisa izimakethe zezimali, kanye nendima emayelana nezinga leziko, emazweni ase-Afrika ayishumi esikhathini esiphakathi kuka 2009 ukufikela ku 2017. Inani lezindlela zokulinganisa izinga lomnotho ezinjenge-*General Methods of Moments (GMM) model* yedatha yephaneli eguquguqukayo, i-*autoregressive distribution lag (ARDL) bound testing approach to cointegration*, i-*vector error correction model (VECM)*, Kanye ne-*granger causality tests* zisetshenzisiwe kucwaningo. Siqhubekele phambili nokwakha inkomba ehlangene yazo zombili izinhlaka; ukuthuthukiswa kwezimakethe zezimali Kanye nezinga leziko ngokusebenzisa uhlelo lwe-*Principal Components Analysis (PCA)*. Imiphumela ikhombisile ukuthi izinga leziko, Kanye nokuthuthukiswa kwengqalasizinda, ukuhluma komnotho, Kanye nezinga lamandla email yizinkomba ezisemqoka zokuthuthukiswa kwezimakethe zezimali kusampuli yethu elula yamazwe ase-Afrika ayishumi. Ulwazi olutholakele ku-*ARDL bound testing approach* luqinisekisa ubukhona kobudlelwano besikhathi eside obuphakathi kwezinga leziko kanye nokuthuthukiswa kwezimakethe zezimali. Yize ukuthuthukiswa kwemakethe yezimali kungenawo umthelela kwezokuhluma komnotho, izinga leziko lona liye latholakala ukuthi linomthelela omuhle nosemqoka kakhulu ekukhuleni komnotho. Ngaphezu kwalokho, uma sisebenzisa uhlelo lwe*Granger causality test*, sifumene i-*uni-directional granger causality* phakathi kwemakethe yezimali Kanye nezinga leziko, lokhu kuchaza ukuthi ukuthuthukiswa kwezimakethe zezimali kuyimbangela esemqoka yezinga leziko. Uma kubhekwa lolu lwazi olutholakele, imigomo eyakhwa uhulumeni kufanele yakhiwe ngenhloso yokuqinisa ukuthuthukiswa kwezinga lezimali Kanye nezinga leziko, kanti lokhu kungafinyelelwa ngokuqinisa kahle umthetho ukukhuthaza ukulandelwa komthetho, kanti ngakolunye uhlangothi kuncishiswe izinga lenkohlakalo Kanye nezinye izihibhe eziphazamiso ukuthuthukiswa kweziko.

AMAGAMA ASEMQOKA: Ukuthuthukiswa kwemakethe yezimali, izinga leziko, ukuhluma/ukukhula komnotho, Ukuhlaziywa kwezigaba ezibalulekile, i-*granger causality*

Tshobokanyo

Maikaelelo a thutopatlisiso ke go swetsa ka ditsamaisi tse dikgolo tsa tlhabololo ya mebaraka ya ditšhelete, ka kgatlhego e rileng mo kamanong magareng ga mebaraka ya setoko le ya sekoloto sa dibanka, jaaka kemedi ya tlhabololo ya mebaraka ya ditšhelete, le seabe sa boleng jwa ditheo, mo dinageng di le lesome tsa Aforika mo pakeng ya 2009 go ya go 2017. Go dirisitswe dithekeniki di le mmalwa tsa ikonometiriki di tshwana le sekao sa *General Methods of Moments* (GMM) sa *data* ya phanele e anameng, molebo wa tekeletso e kopanyang ya *autoregressive distribution lag* (ARDL), sekao sa *vector error correction* (VECM) le diteko tsa sesusumetsi tsa Granger. Gape re tlhamile tshupane ya dikarolo ya tlhabololo ya mmaraka wa ditšhelete le boleng jwa ditheo re dirisa Tokololo ya Dikarolo tse Dikgolo (*Principal Components Analysis* (PCA)). Dipholo di bontsha gore boleng jwa ditheo, gammogo le tlhabololo ya mafaratlhatlha, kgolo ya ikonomi le infoleišene ke diswetsi tsa tlhabololo ya mebaraka ya ditšhelete mo sampoleng ya rona ya dinaga di le lesome tsa Aforika. Diphitlhelelo go tswa mo molebong wa teko e kopanyang ya ARDL di tlhomamisa go nna teng ga kamano ya paka e telele magareng ga boleng jwa ditheo le tlhabololo ya mebaraka ya ditšhelete. Le fa tlhabololo ya mebaraka ya ditšhelete e sa ame kgolo ya ikonomi ka gope, boleng jwa ditheo bo fitlhetswe bo na le ditlamorago tse di siameng e bile di le botlhokwa mo kgolong ya ikonomi. Mo godimo ga moo, ka go dirisa teko ya Granger ya sesusumetsi, re fitlhetse go na le sesusumetsi sa ntlha e le nngwe sa Granger magareng ga tlhabololo ya mebaraka ya ditšhelete le boleng jwa ditheo, mo go rayang gore tlhabololo ya mebaraka ya ditšhelete ke ntlha e e botlhokwa ya sesusumetsi sa boleng jwa ditheo. Fa go lebelelwa diphitlhelelo tseno, go dirwa ga dipholisi ke dipuso go tshwanetse ga dirwa gore go tokafatse tlhabololo ya boleng jwa ditšhelete le ditheo, mme seno se ka fitlhelelwa ka tiragatso e e bokgoni ya molao go rotloetsa kobamelo mme go ntse go fedisiwa bobodu le dikgoreletsi tse dingwe tsa tlhabololo mo ditheong.

MAFOKO A BOTLHOKWA: Tlhabololo ya mebaraka ya ditšhelete, boleng jwa ditheo, kgolo ya ikonomi, tokololo ya dikarolo tse dikgolo, sesusumetsi sa *granger*

Dedication

I dedicate this work to my father, Runyararo Madheu, for his inspiration; and my late mother, Mispah Munyavhi. May her soul continue to rest in peace.

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I would like to express my sincere gratitude to my supervisor, Professor Patricia Lindelwa Makoni who supported me with vivid ideas that contributed to this great work. Thank you for your guidance, for investing your valuable time perusing my work, as well as providing critical remarks which improved the quality of the research project. Furthermore, I am grateful to my econometrician, Professor Godfrey Marozva for his valuable input in the statistical analysis of data used in this study.

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Lastly, I would like to thank the Almighty God for his grace and strength which he has given me throughout my life and during the period of pursuing my course.

List of acronyms

ADF	Augmented Dickey-Fuller
AIC	Akaike information criteria
ARDL	Autoregressive distributed lag
BRICS	Brazil, Russia, India, China, South Africa
CoC	Control of Corruption
KAOPEN	Capital openness
CPIA	Country Policy and Institutional Assessment
DC	Domestic credit to the private sector by banks
ECM	Error correction model
FDI	Foreign direct investment
GDP	Gross domestic product
GoE	Governance Effectiveness
GMM	Generalised Method of Moments
ICRG	International Country Risk Guide
ICT	Information and Communication Technology
IMF	International Monetary Fund
INFL	Inflation
INSTDEX	Institutional quality index
INSTQ	Institutional quality
INTR	Interest rate
IPS	Im, Pesaran and Shin
JSE	Johannesburg Stock Exchange
LAW	Rule of law
LL	Liquidity liabilities
LLC	Levin, Lin and Chu
MG	Mean Group

NIE	New Institutional Economics
OLS	Ordinary Least Squares
PCA	Principal components analysis
PMG	Pooled Mean Group
PP	Phillips-Perron
PoS	Political Stability
RoL	Rule of Law
ReQ	Regulatory Quality
RSA	South Africa
RXR	Real interest rate
SMC	Stock market capitalisation
SMVT	Stock market value traded
VoA	Voice and Accountability
VAR	Vector autoregressive
VECM	Vector error correction model
WGA	World Governance Assessment
WDI	World Development Indicators
WGI	Worldwide Governance Indicators
ZAR	South African Rand

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Chapter 1: Introduction

1.1 Introduction and Background of the study

Financial development is achieved when a country is able to effectively and efficiently channel accumulated savings into productive investment projects by linking the diversification mediators and financial instruments, enhancing the institutional and regulatory system of a country and increasing the size of financial market systems (Hartmann, Heider, Papaioannou and Duca, 2007). In addition, Hartmann *et al*. (2007) further explained financial development as a system that allows modification in the financial system and improvements in performance of institutions and organisations of banking intermediaries, non-banking intermediaries and capital markets.

Gurley and Shaw (1995) asserted that financial markets are the central locus which allow deficit units to borrow funds straight from the lenders, by selling financial vehicles such as securities or issuing bonds. Financial markets consist of three broad markets, being the money and bank credit market, the stock market, and the bond market. According to Odhiambo (2011), financial systems are in two divisions: the bank-based system and the market-based system. Lee (2001) argued that the bank-based system is the most significant financial system to the growth of the economy since it offers short-term investments in the real sector. Lee (2001) further affirmed that market-based systems are too sensitive to stock prices and this happens when stock prices provide more information that is new to managers.

Schumpeter (1911) theorised that the credit bank market plays an important role in funding productive investment projects which result in economic development. Gurley and Shaw (1967) suggested that the banking sector eliminates conflicts in the market by reducing information costs, mobilising savings and providing credit to deficit units. Stiglitz and Weiss (1981) highlighted the important role played by banks in allocating credit efficiently, especially to new and innovative projects. In support, Boyd and Prescott (1986)

and King and Levine (1993) concluded that economic growth is positively influenced by the banking sector as it allocates resources efficiently. The banking market is therefore an important intermediary that encourages economic growth.

Arestis, Demetriades and Luintel (2001) indicated that both stock markets and the banking sector impact economic growth, but the banking sector sustains economic growth for a longer period than stock markets. On the other hand, stock markets mobilise domestic savings by upgrading financial securities available to savers to diversify their securities. According to Caporale, Howells and Soliman (2004), the banking sector is often overlooked due to the perceived important role played by stock markets in the efficient allocation of resources and risk sharing in the financial markets. In addition, stock markets are regarded as the liquid trading and price determining mechanism for different financial securities (Caporale *et al*. 2004).

Maredza and Ikhide (2013) highlighted that a healthy economy is sustained by financial markets' efficiency. Particularly, the existence of a high level of competence in the banking sector gives the possibility of funds being transferred from surplus to deficit units. African financial markets have undergone considerable changes in the past few years, and their banking systems differ with regard to financial development and access to financial services. For instance, the success in restructuring of government owned banks by Egypt and Morocco's banking industry, the universal and rural banking scheme in Ghana which broaden the financial intermediation and the recapitalisation programme by the Central bank in Nigeria which resulted in a reduction of number of bank, intensifying branch penetration (Allen, Otchere and Senbet, 2011). Despite that, we can determine several shared key features. Gulde, Pattillo, Christensen, Carey and Wagh (2006) lamented that banking systems in Africa have an average performance which results from improved micro-economic environments, and limited government involvement that reduces the percentage of default loans. Andrianaivo and Yartey (2009) indicated that credit to private sector as a percentage of GDP and bank assets as a percentage of GDP are higher than a decade back. Even though African countries experienced fast development in banking systems, its measures of financial depth are the lowest in the world (Andrianaivo and

Yartey, 2009). For instance, the highest percentage of bank credit to private sector in African countries constitutes less than 80% of GDP, but more than 100% in more economically developed countries (World Bank 2019).

Table 1.1: Top stock markets in Africa (as at 1 March 2019)

Stock market	***Stock market capitalisation (US $)***	***Stock market value traded (%)***
Johannesburg Stock Exchange (South Africa)	1.056 trillion	80.104
Nairobi Securities Exchange (Kenya)	25.062 Billion	1.179
Nigerian Stock Exchange (Nigeria)	43.923 Billion	0.651
Casablanca Stock Exchange (Morocco)	65.415 Billion	3.309
Stock Exchange of Mauritius (Mauritius)	8.616 Billion	3.199
Egyptian Exchange (Egypt)	44.199 Billion	5.77

Source: World Bank (2019)

From Table 1.1 above, it can be assessed that within the African region, the Johannesburg Stock Exchange (JSE) in South Africa is the largest in terms of market capitalisation, as well as stocks traded. The next biggest stock market in Morocco is almost half the size of the JSE. Nigeria and Egypt stock market capitalisation and stock value added statistics show that they are medium-sized stock markets, while Kenya and Mauritius are small-sized markets, which are in their early stage of development. This can be attributed to the degree of their integration with other global markets.

Quality institutions have been regarded as the most significant drivers of long-term economic growth. Acemoglu, Johnson and Robinson (2005) affirmed that institutions provide a set of rules that control the economic system and are regarded as the constitutional and social rules that present a framework of incentives in a country. According to Hea-Jung and Kim (2010), institutions consist of variables such as the legal and political systems that administer the incentive framework for transactions that regulate the cost of information and transaction. Financial markets highly depend on

several institutional, infrastructural and governance variables that support the relationship of financial sector development and economic growth.

This study was undertaken to determine the drivers of financial market development, with a specific interest in the relationship between the stock and bank credit markets, as proxies of financial market development, and institutional quality in selected African countries. Our time series covers the period from 2009 – 2017, the immediate era after the global financial crisis that rocked many financial markets as a result of the failure to comply with governance and institutional requirements. The study aims to augment the existing empirical literature by extending the argument that good quality institutions are key drivers of financial market development, and by default, spur domestic economic growth.

1.2 Problem Statement

Many African countries have experienced substantial change and they still have extensive opportunities in developing their financial markets. Financial market indicators have improved significantly, along with economic performance. Again, these improvements have been associated with changes in the regulatory and economic environments The banking systems are reasonably sound due to privatization and dominance of foreign banks, increase diversification in stock market investments that are minimally correlated with worldwide financial systems, and more efficiency financial markets that result from sophisticated exchange systems.Despite the remarkable development in the African countries' financial markets, there is still crises of integrity and fairness which has become a major issue in both banking sector and stock markets. The reason for this challenge relates to high level of corruption, misrepresentation of law, unproductive management system and weak political systems in Africa (Doan, 2019).

The South African National Treasury (2018) perceives integrity as the level to which financial markets function in a condition that is, and is considered to be fair, with good governance and organised, where sophisticated regulatory systems are developed and implemented by the oversight bodies to ensure that confidence and participation is

encouraged. Good ethical practices increase confidence and create a conducive investment environment for investors in the financial system. According to the CFA Institute (2010), ethics play a critical role in fostering confidence of investors and, as a result, increase efficiency, and development of financial markets. Pagano (1993) affirmed that the presence of transparency and regulations has an impact on the well-functioning of stock markets, and the obligatory disclosure of reliable information in the financial systems boost investor confidence, and therefore participation.

The World Bank (2018) indicated that governance crisis is a primary contributor to financial market problems in African countries. Once governance starts to deteriorate, low morale and poor performance are doubtlessly developed. According to Nganje (2015), it has been accepted that the obstacles encountered by African countries to achieve sustainable development are largely explained by poor conditions of governance on the continent. Some African countries like South Africa and Nigeria, that achieved substantial progress in economic expansion in the previous years, frequently found their developments affected by governance deficiencies (Anazodo, Igbokwe-Ibeto and Nkah, 2015). These governance weaknesses are portrayed through political marginalisation and lack of transparency in management processes, accountability, and the rule of law (Hamdok, 2003). Acemoglu, Johnson and Robinson (2001) asserted that the low level of development in African countries does not only result from cultural and geographical reasons, but also the presence of poor institutions in Africa.

According to the Africa Competitiveness Report (2009), even though there were some developments made in recent years, African countries continue to struggle with the standards of the regulatory environment and the cost of operating. In response to this situation, Dahou, Omar and Pfister (2009) indicated that governments should concentrate on supporting the creation of credit bureaus in charge of providing repayment records and other information to financial institutions. In addition, African governments would need to focus on mitigating the legal and regulatory impediments that hinder business operation, while at the same time aspire to implement measures that promote it. Legal and regulatory systems protect creditor rights and private property by establishing

uncomplicated and transparent property registration procedures, improvement of contract enforcement systems, facilitating bankruptcy procedures, and setting up commercial courts (Dahou *et al*. 2009). The above-mentioned steps would significantly enhance the economic environment and increase the depth of African financial markets.

1.3 Research objectives

Considering the interactions between financial markets and institutions, this study broadly sought to understand the role of institutional quality in driving financial market development in selected African countries.

Specifically, this study aimed to address the following objectives:

- To identify the drivers of financial market development in selected African countries;
- To assess the causality between financial market development and institutional quality in selected African countries; and
- To examine the effects of financial market development and institutional quality on economic growth in selected African countries.

1.4 Research questions

In order to achieve our objectives, we posed the following questions:

- What are the drivers of financial market development in our selected African countries?
- What is the causal relationship between financial market development and institutional quality in the selected African countries?
- What effects do financial market development and institutional quality have on economic growth in our selected African countries?

1.5 Justification for the study

Based on the preliminary literature review, there is abundant evidence on the pivotal role of financial market development in other developed and developing countries. The African financial and macroeconomic landscape is however affected by other factors, which we sought to confirm by this study. As such, it was deemed essential to conduct this study so that enough academic understanding and knowledge on financial market development, institutional quality and economic growth in the context of African countries can be acquired. From this, we would then be able to conclude on the relationships that exist between these key variables, which would aid guidance on steps to be taken to formulate appropriate macroeconomic policies towards strengthening the local financial systems to encourage economic growth. Further, our findings will reveal the extent to which integration of the sampled countries' financial markets is affected by global and local trends in institutions and other market regulations. This information can be used by regulatory authorities to curb illicit capital flows of capital into and out of the local markets in instances wherein investors wish to take advantage of institutional loopholes and laxities in the sampled countries under study. This study further intended to confirm various financial market development and institutional quality indicators that will assist policy makers in identifying and prioritising areas that need improvement in developing the financial sectors in the African counties.

1.6 Limitations of the study

This study focused on only ten African countries, namely; South African, Nigeria, Morocco, Cameroon, Egypt, Kenya, Botswana, Mauritius, Ghana, and Namibia. Chosen primarily on the basis of availability of complete data on the respective countries' financial markets, institutional and other economic variables, this study will to some extent, have limited generalisability to other countries. However, there are lessons emerging from this study that can be considered by policymakers of other developing countries in the African continent, in a quest to improve their own financial market operations considering institutional quality.

1.7 Outline of chapters

The research study is structured as follows: Chapter 1 provided a general overview of the study. The chapter also highlighted the research problem, research objectives, research questions and benefits of the study. Chapter 2 provides a literary framework of the study, reviewing relevant theories and existing empirical studies pertaining to the key concepts in our study. Chapter 3 presents the methodology which was adopted for the purposes of data collection and analysis, while Chapter 4 lays out the research findings and discussion of results thereof. The study ends with Chapter 5 which entails a summary of the key findings, recommendations, as well as proposals for future research.

Chapter 2: Literature Review

2.1 Introduction

This chapter provides an overview of the theoretical framework and existing empirical literature relevant to this study. The key concepts are defined, and the respective theoretical underpinnings and empirical evidence are reviewed in detail, in an endeavour to locate this particular study within the existing literary works. Further, an attempt was made to emphasise the important links between financial market development, institutional quality and economic growth.

2.2 Definition of key concepts

2.2.1 Financial market development

Mosteanu (2017) described financial markets as a marketplace, where formation and trading of financial assets occur, which enables buyers and sellers to interact and facilitate exchange of financial instruments. Generally, it is a system that enables the distribution of funds from excess units to deficit units with the main aim of maximising return, while maintaining information and transaction costs as low as possible.

The term “financial market development” is regularly used in many studies, but up to the present, there is no collective opinion on its exact definition. Mihajlovic (2016) described financial market development as the well-functioning and development in the financial sector, intermediaries, instruments and markets. In addition, the effectiveness in financial markets will result in advancement in risk management, facilitate trade and allocation of capitals, a reduction in information cost, better savings and investment mobilisation and easing commodity exchange. Mihajlovic (2016) concurred that financial market development is determined by efficiency in the financial system achieved by mobilising resources effectively. Sekakela (2018) stated that financial development is a situation, in which there is an expansion in financial markets achieved by liberalisation of financial markets, financial deepening, innovation, competition and changes in the functioning of financial markets.

The International Monetary Fund (IMF, 2005) affirmed that financial competition occurs when there are many financial institution rivals in the financial market, leading to increased financial instruments, a wider range of customer selection due to increased number of financial service providers and financial securities. Efficiency in financial markets results when competition intensifies, which leads to reduced costs of borrowing, and further development of financial markets (World Bank, 2010). In summary, according to Ranciere and Tornell (2016), financial liberalisation is the elimination of a chain of obstacles in the financial markets. Later, Marc (2018) asserted that financial market liberalisation happens when a country opens its stock markets for foreign investment, as well as authorising local investors to gain access to foreign financial markets.

Alrabadi and Kharabsheh (2016) argued that financial deepening is the multiplying, improvement in quality and increase in a range of financial market products. Chakraborty (2017) state that financial deepening is when investors and borrowers eliminate financial intermediaries such as banks and invest in other funding sources, for instance, in capital markets. According to Alrabadi and Kharabsheh (2016), financial deepening is when it is possible for financial sectors to access the financial markets, there is increased liquidity and a wide range of financial products designed for diversification. In general, the development of financial markets and financial institutions can be influenced by the deepening of financial markets.

With the recent global developments in the financial markets, such as the emergence of fintech and cryptocurrencies, a study on financial market development would be incomplete if it did not address the role of financial innovation. Financial innovation refers to a situation whereby there are newly acquired, and more advanced financial instruments, financial technology and regulations introduced and established in the financial markets (Qamruzzaman and Wei, 2018). According to Mollaahmetoglu and Akcali (2019), financial innovation can be branched into four groups: specifically, the risk transferring innovations which intend to spread risk of a distinct instrument; liquid enhancing innovation which intends to maximise liquidity in financial markets (for

instance, the securitisation of financial markets); credit- generating innovation which seeks to increase the amount of credit available in financial markets; and the equity generating innovation which aims to expand the purpose served by equity in the financial assets (for instance, the debt-equity swap technique).

For the purposes of this study, financial market development (FMD) is a term that will be used to refer to the development of the domestic stock market, in terms of market capitalisation and trade; as well as the advancing of credit to the private sector by banking institutions. Both the stock market and the bank credit market serve to meet the financial needs and expectations of both domestic and international investors.

2.2.2 Institutional quality

The most frequently used definition of '*institutions*' is that of North (1990), who described institutions as human constraints that structure political, economic and social interaction. In other words, institutions are principles governing the interaction of all society representatives and must be shared by all members. North (1993) distinguished institutions from organisations where the latter is the player of the game which consist of individuals, firms, organisations and some other social contract. North (1993) in this case described the game as any social interaction. According to Law and Azman-Saini (2012), institutions provide guidance on what people are not supposed to do and they provide certain requirements under which people are supposed to follow when performing certain activities. Ferrara and Nistico (2019) state that the explanation of institutions is centered on the rules or forms of contact which are designed to mitigate uncertainty, monitoring the environment or game and maintaining lower cost. We further considered another definition of institutions which was put together by Ostrom (1990, p. 51):

> '*Institutions can be defined as the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions*'.

The idea of arena in Ostrom's definition is comparable to North's idea of the game.

According to Kuncic (2012), institutions are classified into three groups: category, level of formality and the level of embeddedness. With regard to category, Joskow (2008) grouped institutions as legal, political, social and economic institutions. Legal institutions are the most common institutions widely acknowledged by scientific society that are included in the contract and they are in different nature, thus public or state designed institutions and private legal institutions. Formal institutions, in the level of formality categorisation, are primarily shaped by legal institutions (Kuncic, 2012). Legal institution has been considered as the most crucial as they are comprised of fundamental issues like property rights, the origin of legal issues and their consequences, and legal enforcement (Kuncic, 2014). Political institutions are concepts that are in relation to the voters, electoral law, political forces and regulations of the government whereas economic institutions are almost completely covered in legal institutions and are institutions necessary for assuring a smoothly functioning market, in particular, legal systems, enforcement on property rights and some parts of regulation (Kuncic, 2014). In addition to Kuncic's (2014) explanation on classes of institutions, social institutions are cultural issues such as norms, beliefs and values that largely form part of informal institutions in the level of formality categorisation.

Institutions can also be classified according to their level of formality. Formal institutions consist of formal rules, such as property rights, constitutions, and law and informal rules that include customs, traditions and self-imposed rules of conduct (North, 1993). Formal institutions are written rules designed to control human interaction and exchange which are administered by courts, judges or the state. On the other hand, informal institutions are oral codes of conduct that control human interaction which are extracted from share norms and behaviour and they depend on self-regulatory mechanism to ensure that contractual obligations are observed (North, 1993). However, the existence of these institutions helps to protect members of the society from increasing free ride and high punishment cost of defectors (North, 1993). Formal and informal institutions work according to different principles, but are all designed to mitigate the uncertainty in human

exchange. The present study focuses on the formal group of institutions, which comprise of economic and political institutions.

Williamson (2000) elaborated on the level of embeddedness as a classification of institutions. The Williamson's classification on institutions explains the connection between formal and informal institutions by employing the approach of the embeddedness of institutions (Williamson, 2000). Following this classification, Williamson (2000) indicated that institutions have different levels of embeddedness which ranges from level 1 (which reflects the higher embeddedness institutions) to level 4 (which reflects the lower embeddedness of institutions). Level 1 is largely composed of informal institutions, namely, customs, traditions, norms and regulations, and its interval of time to change is100 to 1000 years. Level 2 is described as less embedded and it includes formal institutions such as property rights, polity judiciary and bureaucracy with the time interval of 10 to 100 years of change. Level 3 consists of governance institutions, where governance systems are matched with transactions, for instance, contracts aligned with their transaction costs. The frequency of change for level 3 is 1 to 10 years. Lastly, level 4 displays rules that control the distribution of resources and employment, and changes at this stage can occur on a continuous basis.

Institutional quality is achieved when designated rules are consistent and respected, corruption is reduced, rule enforcement is solid and property rights are well defined (North 1990). Financial experts accept that quality institutions are required to be in charge of controlling risk that comes from financial markets (Agyemang, Gatsi and Ansong, 2018).

2.3 Theoretical Framework

2.3.1 Financial development

2.3.1.1 Finance growth theory

The perspective that financial development encourages economic growth was suggested by Schumpeter (1912). Since then, a number of financial experts have researched this relationship and concluded that financial development becomes relatively more important

in achieving high rate of economic growth (McKinnon, 1973; Shaw, 1973). Kuznets (1955) concluded that reforms in financial markets begin to happen when the economy proceeds towards the intermediate stage and becomes more sophisticated when the economy is fully developed. In contrast to Kuznets (1955), Lewis (1995) found that the financial development is the driver of economic development. These conflicting perspectives can be classified into two groups so-called “The supply-leading” and the “demand-leading” hypothesis.

According to Patrick (1996), the supply-leading hypothesis, which is also known as the “finance-growth nexus’’, argues that financial systems promote economic growth through the channeling of resources from areas of surplus to deficit units so as to increase production. However, this is also made possible by reducing information asymmetry, thereby improving efficiency in resource allocation. The demand-leading hypothesis is also known as the “growth-finance nexus”. This view was postulated by Robinson (1952) who argued that “where enterprise leads, finance follows”. This strand criticises the role of financial systems in stimulating economic growth. It argues that it is in fact improvements in the economy that affects the development of financial systems. Thus, improvements in the economic activities result in increased demand for financial services.

2.3.1.2 Financial development theory

The key determinants of financial development are examined thoroughly in the literature of McKinnon (1973) and Shaw (1973). McKinnon developed an outside money model of an economy with poorly developed financial markets. He argues that investors who participate in such kind of an economy depend more on self-funding than debt financing. McKinnon (1973) suggested that potential investors should save money in the form of bank deposits before they finance large-scale investments. He further stated that money holding, and capital accumulation are complements rather than substitutes, where money act as channel to capital formation in the financial development process. McKinnon (1973) stresses that the restrictions in the banking sector that involves interest rate control, reserve and liquidity requirements, and interference of government in the pricing and allocation of loanable funds, which as a result reduce the real interest rates, discourage the development of financial sector and ultimately reduce growth. However, the model

shows that the restrictive factors above result in poor quality and limited amount on investment due to inadequate savings.

From another point of view, Shaw (1973) proposed a financial intermediation concept rooted on an inside money model. The model displays the importance of financial intermediaries in mobilising of savings. Financial intermediaries enable the accumulation of increased volume of savings because their presence relieves investors from incurring information asymmetries and information cost. Following Shaw's (1973) model, financial intermediaries maintain information asymmetries cost as low as possible so that the cost of mobilising savings are reduced, and because of this, investors feel at ease and abandon the idea of managing their own funds. The main idea that both McKinnon (1973) and Shaw (1973) share is that high interest rates promote financial development through higher capital accumulation generated from increased amount of savings. In addition, high interest rates improve bank liabilities and enables it to efficiently distribute funds to more fruitful investment projects (McKinnon 1973; Shaw 1973).

2.3.1.3 The financial intermediation theory of banking

According to Werner (2016), the most recently proposed financial intermediation theory of banking advocate that banks play an important role by accumulating deposits from savers and lend them to investors in the same manner as other financial intermediaries. Dewatripont, Rochet and Tirole (2010) described that banks generate cash by borrowing short, thus banks raise funds that must be readily available on short notice and lending long, which means they lend to borrowers money that will not be available to them for a long time. Economic scholars such as Keynes (1936); Gurley and Shaw (1955), Diamond and Rajan (2001); Gertler and Kiyotaki (2011) and Stein (2014) unravelled the financial intermediation theory of banking. Amongst other eminent scholars, Mises (1912) argued that banks act as mediator of the givers of credit and the receivers of credit. Thus, banks are distinguished by extending credit to other people using borrowed money. Mises (1912) concluded that bankers are those who lend funds of others, and capitalists are those who lend their own capital, although they are not bankers.

Gurley and Shaw (1995) supported the idea that banks and non-financial institutions serve the same purpose intermediary role, thus leading to a conclusion that there is nothing so exceptional about banks. This view has also been discovered by Tobin and Brainard (1963), who asserted that the difference between bank and other non-bank financial intermediaries is not justifiable. Instead, the contrast between the two is that they operate on different levels but still falls in the same category. They further articulated that the difference between bank and other non-bank financial intermediaries basically has nothing to do with the monetary nature of bank liabilities. However, Tobin and Brainard (1963) highlighted that the major important difference is that banks have special reserve requirement and interest rates ceilings. Baltensperger (1980) concluded that banks are financial intermediaries that are not capable of generating money but they, to a certain degree, become involved in some uncertain process of risk transformation. Essentially, he alluded that banks serve as dealers or brokers in the credit markets.

2.3.1.4 Credit creation theory of banking

Contrary to the financial intermediation theory of banking, the credit creation theory of banking affirms that banks cannot be considered as financial intermediaries whether in collection or separately (Werner 2016). Banks create credit and money without any input, and this happen when they perform bank loan contracts and acquire assets thus it is unnecessary for banks to initially accumulate deposits or reserves for them to lend to investors (Werner, 2016). The credit creation theory further suggest that the increase in unsettled bank credits cause a rise in bank balance sheets and measures of money supply, whereas the financial intermediation theory assumes that the only actual purchasing power can be redistributed and the money surplus does not increase.

However, this idea was initially postulated by Macleod (1856), Schumpeter (1912) and Hawtrey (1919). One of the most reliable scholars, Macleod (1856), once a specialist in the banking sector, gave a special indication on the importance of incorporating the accounting, legal and financial aspects. Macleod (1856) argued that banks have been wrongly perceived as the economy of capital, and that the main line of work for banks is to acquire deposits from one group of people and lend them to another group. Macleod

(1856) concluded that banks borrow money, not to lend but to create extensive credit, increase their commitment to pay many time deposits (credits are required to be paid on demand) and carry out all the functions that are equivalent to the amount of money. Thus, banking is not an economy of capital, but an increase of capital.

Davenport (1913) also affirmed that banks do not lend money, but they offer credit for which they charge an extra fee, thus interest, for utilisation of the service. However, it is widely accepted that the old banks offered credit in the form of bank cash notes and that this created currency (Davenport, 1913). In the present day systems, the credit is brought into existence in the form of deposits, which spread in the form of bank cheques within this system

Advocates of the credit creation theory also include James (1930) who concluded that banks are in a position of generate credit that is far more than the total amount of deposits made by the public, and give rise to liabilities in the balance sheet which does not result from customer's deposit but through granting loans or discounts to clients. Generally, James (1930) asserted that banks capitalise credit and create the non-existent purchasing power by providing debt holders with ways of clearing their debts in the absence of lessening the amount of cash hold by the public. An increase to the actual amount of bank loans, therefore, contributes to an increment in the aggregate supply of money in the public, and any decrease in that amount will lower the total amount of money (James, 1930).

2.3.2 Institutional quality

2.3.2.1 Neo-classical theory

The neoclassical theory is undeniably the most well-known and influential theory in the history of economics, and it is also indicated as orthodox economics (Finlayson, Lyson, Pleasant, Schafft and Torres, 2005). In support, Gowdy (2009) asserted that the theory overshadows others in the neoclassical economics due to its history of great ideas and its consistent, completely developed model and accurate methodology tailored to deal

with different practical and theoretical problems. Neo-classical paradigm is classical in the sense that it is based on the assumption that the efficient allocation of resources which controls the performance in the economic systems and creates equilibrium through the interaction of supply and demand or through self-regulating personal aspiration of market participants result of liberalisation and free competition in the markets (Finlayson *et al.*, 2005). North (1990) indicated that the neo-classical economic model holds that market participants have complete information, unlimited understanding of individuals to process information, they can be easily motivated and with stable and objective preferences.

North (1991) described that in a completely neo-classical world, the earnings received after performing a transaction are at zero cost in view of the fact that parties involved in costless trading are aware of the other party and the enforcement is faultless. Thus, institutions are irrelevant in a world of perfect information. According to Hobbs (1996), the economic agents are believed to hold perfect information, on that account, there no uncertainty relative to price, no quality variations between products and no difference in operation of competitors and parties involved in trading.

The neo-classical theory is also based on the assumption of rationality and considers the maximisation of pleasure (utility) as the basis of rationality (Deguech, 2007). In this notion, individuals are believed to be self-interested and having well designated goals that they follow in a most productive achievable way (Fehr and Schmidt, 2006). In order to reach this desired objective, individuals are supposed to maximise utility based on what they can afford, and institutions are supposed to maximise their return based on what is technically possible for them to attain (Elster, 1989).

2.3.2.2 The new institutional economics

The new institutional economics (NIE) is broad multi-disciplinary subject that covers the areas of economies, history, sociology, political science, business environment and law. The theory was introduced by Coase (1973), in a study based on the nature of firms in which he claims that firms are more competent and have the ability to cut back costs associated with production (Coase, 1973). He also believed on the importance of long-

term contracts particularly in the case where cost of negotiation and enforcement of market contracts are very high (Coase, 1973). The term “New Institutional Economics” was created by Oliver Williamson with the aim of differentiating between the new economies’ ideas and the old institutional ideas.

The NIE merges the agency and transaction cost economies theories in the economic organisation systems (Coase, 1998). The first, agency theory explains on the agency issues that arise between business principal, which are shareholders, and agents, which are company executives (Coase, 1998). Positive agency costs are outlined as the total cost incurred by the shareholders during the monitoring process, the cost incurred by agents in providing in auditing and financial information to landers and residual loss (Jensen and Meckling, 1976). Positive agency cost is also addressed as a part of transaction cost (Mahoney and Rajendran, 1992). On the other hand, transaction cost economies addresses the need of implementing effective governance systems which controls transactions in a business organisation setup (Coase, 1998). The NIE stretches to incorporate the aspects of legal, environmental and organisational setting where transactions take place.

Following North (1991), the new institutional approach entails that economic agents employ resources and play games according to decision rights which are defined, distributed and redistributed by distinctive types of devices, in specific contracts, organisations and institutions. Economic growth is encouraged by the environment of the industry and its surrounding social and political arrangement in the financial systems such that roles of institutions to economic growth are recognised (Haggard and Kaufman, 1992).

According to Menard and Shirley (2012), the new institutional economics describe the different types of economic explanations of institutions which consist of the property rights, exploration cost economies, contracts theory and the new institutional approach to history. North (1990) directs his study on economic exploration of structure and performance of economies through time and identified that institutional constraints are

rules of behaviour which are mandatory to human cooperation. Institutional constraints are insignificant if the world is established in a zero transactions cost with perfect foresight, and this is without impact on the production of the economy. However, this is not applicable in the world of positive transactions cost and imperfect foresight. North (1990) further pointed out that the economic performance is determined by the quality of institutional framework as it mitigates the uncertainty of human interactions which is the cost of cooperation.

According to North (1990), institutions that change due to economical transaction cost are fundamental to the achievement in the economies. The path dependency and history play an important role in describing changes in institutional development. Not all institutions are competent. Inefficient institutions can result from the control of institutions by influential people to satisfy their own interests which impede growth.

North (1994) developed a theory that combines the idea of institutions, transaction cost and the neo classical economies. According to the idea, transaction cost consists of costs that are associated with collection of information on competitive prices prior to transaction cost, setting up contracts and enforcement of contract in case where one party does not comply North, (1994). However, these costs have an impact on profits generated in an economy and they also determine the amount and type of goods to be produced or not to be produced at all. Coase (1960) pointed that transaction cost always exist in all economies even if the economic system is under government control or not. The study of Williamson (1993) also corresponds with that of Coase (1960), wherein he developed a framework proving that an economic exchange has to occur between the cost of coordination and the level of command within an organisation, and the cost of transaction and shaping contracts in the market. However, this economic exchange is only determined by the amount of transaction cost (Williamson, 1993).

According to Menard and Shirley (2012), the New Institutional Economics reject the assumptions of the neo-classical theory which conclude that individuals have perfect information and have no limit to rationality and that transactions are free and are done

instantly. New institutional theory deduces that individuals have insufficient information and limited mental competence which causes them to experience uncertainty about unanticipated events and results and become subjected to cost of seek information. The new institutional theory suggests that the construction of institutions, drafting and enforcing the fundamental principles, laws, contracts and regulations minimises risk and transaction cost.

The new institutional economics theory attempts to provide solutions to problems that the neoclassical does not present, and which make it recognised differently by a number of scholars (Menard and Shirley, 2012). North (2006) criticised that the neoclassical theory could not account for the economic change, not so much on political and social change. In opposition to the neoclassical, the new institutional economics theory is much more concerned with grasping human incentives, aims and beliefs, norms and rules that are designed for them to achieve their specified goals (North, 2006).

2.4 Empirical Literature

2.4.1 Financial market development

Extensive literature exists on the relevance of institutions on financial sector development. It has become generally accepted that financial system development is induced by institutional improvement in the investment climate such as private property rights' protection, well-balanced political environment and well-constructed legal system for law and contracts enforcement (Beck and Levine, 2005).

Osondu, Asogwa and Ifeanyi (2014) affirmed that the general quality of property rights protection and political stability enhancement of contract enforcement and corruption control are the most significant institutional factors that encourage financial development. This implies that enhancement in institutional quality such as property rights protection and political stability foster economic development through their beneficial impact on financial deepening. Le, Kim and Lee (2016) conducted a study on the determinants of financial development in Asia and the Pacific from 1995 to 2011. Le *et al*. (2016) applied

the dynamic generalised method of moments to a panel data set of 26 economies in the region. Their results reflect that better governance and institutional quality encourages development in the financial systems in developing economies. Hosain and Nowreen (2015) asserted that stock markets are particularly important to an economy because they improve the liquidity of financial markets, thus enabling portfolio and risk diversification in both local and global markets, while at the same time, maximising shareholders' wealth.

Ruiz (2018) investigated the relationship that exists between the legal environment and financial deepening, and further linking this to long run economic growth. The findings suggest that the legal and regulatory environment are of great significance for the development of financial systems. Ruiz (2018) further explained that countries with well-balanced legal and regulatory systems that have a prime concern on creditors to be presented with full present value of their capital have efficient financial systems compared to those countries that have limited support on creditors. The findings also clearly show that contract enforcement is an important factor in determining financial deepening. Ruiz (2018) concluded that financial development is achieved when countries are compliant with laws and enforce contracts. Development in the financial system is limited in countries where enforcement is more lenient. Ultimately, Ruiz (2018) found that transparency is also significant in promoting financial deepening. For example, countries with organisations that disclose detailed and authentic financial statements have well-structured financial systems compared to countries with organisations where published information is less reliable.

Khan, Khani and Zuojun (2020) conducted a study assessing the influence of institutional aspects such as dependable information, contract enforcement, political stability and corruption on financial system enhancement in some developing and emerging economies. They employed the dynamic models OLS, fixed effect, random effect and generalised method of moments (GMM) estimators to determine the effect these aspects have on the development of financial systems of the 189 selected countries. Khan *et al*. (2020) concluded that institutional aspects are of great importance in all surveyed countries in their study. However, they also concluded that institutional factors actively

encourage financial development and better access to financial services. Pertaining to the results, Khan *et al*. (2020) deduced that institutional reform should be highly considered in order to enhance financial sector development for individual countries.

Looking at financial development from another perspective, we find that there are different factors that shape financial markets in a more efficient way. The literature below provides evidence on some of these factors.

There is a growing evidence that Investor protection is a crucial factor in stimulation of growth in financial markets (Chu, Chan, Nadarajah and Osterrieder, 2017). A further confirmation of investor protection as a determinant financial development is highlighted in law and finance literature, which specify that investor protection represent a significant contractual environment conducive for financial development. Chu, Tsai, Chen, Li, Zhai, Chen, Jing, Ju, Li (2017) found that countries which consider investor protection through enforcement result in well-developed financial markets. Giannetti and Koskinen (2010) earlier indicated that in a situation whereby a country fails to protect investors, affluent investors take advantage and become in charge. However, the stock price is determined by both dominating and portfolio shareholders and because of this control from wealthy shareholders, the weak stock price make it impossible to derive private benefit (Giannet and Koskinen 2010). (Giannet and Koskinen (2010) deduced that investors, as a result, are entitled to lower expected returns which lead to limited participation in local markets and negatively affect financial development.

According to La Porta, Lopez-De-Silanes, Shleifer and Vishny (2000), a higher level of investor protection supports financial development due increase in supply of funds caused by increase in confidence and participation of investors. In addition, Wu, Di and Li (2015) conducted almost a similar study applying capital market data and deduced that higher degree of investor protection increases funding of enterprises and as a result funds are effectively allocated in productive investments that encourages financial development.

Fernandez and Tamayo (2017) identified market frictions, such as information asymmetry and transaction cost, to have an impact on financial development. In the credit markets, credit rationing can cause adverse selection which cause failure in financial markets Stiglitz and Weiss (1981). When there is a rise in interest rate, high quality borrowers withdraw from the markets and raising the possibility of default which affect lenders' expected return (Stiglitz and Weiss, 1981). Distribution of funds among different borrowers happen by either embracing the symmetric information credit allocation or limiting funds from some borrowers receiving credit in the absence of asymmetric information (Calomiris and Hubbard, 1990). Thus, reduced loans for some or all classes of asymmetric information borrowers lead to inefficiency in credit markets.

As mentioned earlier by Fernandez and Tamayo (2017), transaction cost is another influential market friction on financial development. Reduction in transaction cost result in some borrowers to become better informed than others (Akerlof, 1970). He further elaborates that lower transaction cost engage inadequately informed players into market. Akerlof (1970) conclude that lower transaction cost hinders financial development. In favour of the above, Levine (1991) indicated that an increase in liquidity in the stock markets is stimulated by lowering cost of transaction, information asymmetric and contract enforcement. In addition, reduction in market friction cost improves financial development as it allows diversification on investment projects and increased investment because investors find funds attractive (Levine 1991). Thus, transaction costs are influential in changing market participant behaviour that affects financial development (Levine, 1991).

2.4.2 Determinants of financial market development

2.4.2.1 Inflation rate

Inflation is one of the macroeconomic factors that influence the development of financial system and this is achieved when a country maintains inflation rate at lower level. Empirical literature of Ho and Iyke (2018), Badeeb and Lean (2017), Yusoff and Guima (2015), and the theoretical work of Huybens and Smith (1999) investigated the influence

of inflation on financial system development. Huybens and Smith (1999) concluded that higher inflation rates deter the efficiency of financial systems as financial markets are expected to reduce in size, become less active and illiquid. Jepkemei (2017) confirmed that a rise in inflation rate causes a reduction in the real rate of return on money and other financial assets which, as a result, discourages lending, and increases borrowing by agents. A decrease in the availability of credit, together with the reduced high-grade borrowers, results in a rise of credit market frictions. In addition, Jepkemei (2017) pointed out that credit market friction causes credit limit resulting in the reduction of the amount of loans in the financial sector, and less functioning of financial systems due ineffective in resource allocation, thus negatively affecting capital formation, and less development in the stock markets.

Khan (2015) showed that inflation is an obstacle to financial development. They concluded that inflation raises the interest rate that investors think will prevail in the future, and that will factor into their decision-making. As a result, this promotes capital outflow and discourages decisions for private activity. Consequently, the investors' interest in credit falls and the availability of credit is reduced due to shrinking pool of financial savings since investors change from liquid assets to keep away from the risk of the inflationary tax Khan (2015).

Contrary to the above findings, Shahbaz, Shahzad, Ahmad and Alam (2016) and Bayar (2016) concluded that low levels of inflation may encourage financial deepening rather than hampering it. For instance, Iran is one of the countries where inflation rate is always maintained on low levels, receives foreign investment flows, therefore indicating that inflation may have a positive influence on financial development.

As such, in this study it can be expected that inflation will have a mixed effect on financial market development because high inflation rates will tend to increase the interest rates on funds; higher rates translate to higher returns for investors but more expensive rates for borrowers.

2.4.2.2 Interest rates

Theoretical literature of Cooley and Smith (1992) indicted that interest rates are important in determining stock market prices. Cooley and Smith (1992) argued that the well-functioning of financial markets is determined by the level of interest rates, and given that the level of interest rates are too low, there will be inadequate incentives for agents to specialise and this results in the weeding out of potential borrowers from specialised entrepreneurs. On the other hand, low interest rates encourage potential lenders to eliminate agents and invest on their own so that they benefit from incentives, leading to non-functioning of financial markets as their roles for supplying services suffer. Badeeb and Lean (2017) asserted that countries with low level of interest rates have sound stock markets compared to countries with higher level of interest rates. Badeeb and Lean (2017) further explained that stock markets in well-developed countries are at a more advanced level because of low interest rates.

Adebowale and Akosile (2018) examined the developing economies of Nigeria which experienced a higher interest rate and concluded a negative relationship between higher interest rates and stock market performance. Adebowale and Akosile (2018) accepted that stock market prices and interest rates are negatively correlated. He further explained that lower interest rates are influenced by the expansionary monetary policy and this results in lower cost of borrowing, which in turn leads to increased business investments.

Likewise, Huang, Mollick and Nguyen (2016), found a negative relationship between stock market development and higher interest rates. Huang et al., (2016), argued that higher levels of interest rates degrade the value of stock as it is illustrated in the dividend discount model making fixed income securities more attractive to investors than stocks. Tursoy (2019) supported a negative relationship and concluded that a rise in interest rates negatively affects the present value of the future dividend income, which in turn results in reduced stock prices. In addition, Tursoy (2019) found that higher interests discourage potential investors from borrowing and investing in stock markets because of the

increased cost of capital. On the other hand, low interest rates cause a decrease in the cost of borrowing and this encourages investments and other economic activities.

In contrast to the above literature, Eldomiaty, Saeed and Hammam (2018) concluded a positive relationship between interest rates and stock prices. Eldomiaty et al. (2018) indicated that investors easily predict the future value of certain economic variables due to changes in stock prices. For instance, if there is a cutback on stock prices, investors assume that interest rates will continue to decrease. However, this assumption negatively impacts stock prices because fixed income securities gain value if interest rates continue to drop.

2.4.2.3 Economic growth

Economic growth is the process of development in the national economies and the micro-economy indexes, particularly the gross domestic product per capita and it is proxied as gross domestic product growth (Guru and Yadav, 2020). GDP is the aggregate monetary value of finished goods and services produced within the nation's boundaries over a time-bound framework (normally a year) (Kadir, Azwardi, Wardhani and Novalia, 2018). Therefore, GDP growth is the expansion in the inflation-adjusted market value of goods and services produced by an economy over time, and it is determined by the amount of increase in real domestic product (IMF, 2012).

Schumpeter (1911) indicated that financial markets play a significant role in building an efficient economy because they redirect funds from inefficient investments to more productive investment projects. In addition, Schumpeter (1911) concluded that the banking system contributes to GDP growth by the mobilisation of savings, promotion of innovation and provision of funds for beneficial projects.

Levine (2002) argued that financial markets contribute to the growth of the economy in different ways. Financial intermediaries lower the cost of collecting and processing information, and result in better allocation of resources. This results in better investment, which stimulates the competitiveness of an economy. In addition, banks can effectively

eliminate the corporate governance problem by reducing monitoring costs which keeps credit rationing at a low cost, thereby boosting the economy. Financial intermediaries provide vehicles for trading, pooling and diversification of risk, and further provide attractive instruments through mobilisation of savings, and this thus promotes economic growth.

Pradhan, Arvin and Norman (2014) examined the casual relationship between financial market development and economic growth. They found that the efficient allocation of resources by financial intermediaries due to adequate knowledge of obstacles that affect investments result in a positive effect of financial systems on GDP growth. Nyasha and Odhiambo (2014) found that banks significantly contribute to GDP growth and this is stimulated by the level of competitiveness in the financial systems. Ductor and Grechyna (2015) conducted a study in 101 developed and developing countries using panel data techniques over the period 1970 to 2010. Their results showed that GDP growth negatively affects financial market development. According to Owusu (2016), GDP growth is determined by the increase in accumulated savings available for investment, and the ability of financial markets to convert these savings into investment. This implies that the development of financial systems is essential for GDP growth.

2.4.2.4 Financial liberalisation

The seminal work of McKinnon (1973) and Shaw (1974) concluded that financial liberalisation results in an increase of real interest rates that gives a competitive advantage and stability in financial markets. McKinnon (1973) and Shaw (1974) further discussed that both domestic and foreign investors benefit from financial liberalisation because it enables diversification in portfolio, therefore, resulting in reduced costs of borrowing.

Balogun, Dahalan and Hassan (2016) and Akinsola and Odhiambo (2017) concurred that financial liberalisation increases the pooling of funds and diversification of risk and this results in the smooth functioning of financial markets. Batuo, Mlambo and Asongu (2017) asserted that some countries actively support the improvements of local financial markets

by encouraging the entry of foreign financial intermediaries.

Aluko and Ajayi (2018) described financial liberalisation as transferring ownership of the financial institutions and banks owned by the government to private enterprises, increasing access to financial systems. Central banks should operate as an independent institution without the control of the government, and deprivation of legal force on credit control systems. According to Marc (2018), financial market liberalisation is a resolution made by a country's government to relax or raise bank interest rate ceilings, reduce mandatory reserve requirements and entry restrictions, lower government intervention in credit rationing decisions, and allowing banks and insurance companies to operate independently. In addition, Ilhan (2019) supported the notion that liberalisation of capital markets reduces the cost of capital that results from the reduction in expected return which covers for risk and agency cost.

Edison, Klein, Ricci and Slok (2004) concluded that financial liberalisation contributes to the development of financial systems in various ways. Firstly, liberalised financial system is exposed to international competition that enhances the effectiveness of the local financial system by applying international standards through embracing the spirit of "flight to quality" created by external financial markets. Secondly, foreign banks increase the size of domestic banking systems by extending their subsidiaries into the local banking system and bring in transformation that enlarges the capacity of financial services. The expansion in the domestic financial markets, which increases efficiency, enables pooling of available funds by extracting domestically generated funds and encourages capital inflows. In the long run, the large amount of accumulated savings, as a result, may stimulate additional efficiency by allowing financial intermediaries to benefit from significant economies of scale. The development of financial markets through liberalisation also increases the availability of funds to borrowers who may have beneficial investment opportunities (Andries and Caparo, 2013). Guermazi (2014) suggested that financial liberalisation thus allows developments in financial infrastructure that mitigate information asymmetry and increases accessibility of credit facilities.

2.4.2.5 Infrastructure

Regan (2017) defined infrastructure as the network, assets and services that support economic and social activity in the economy. Infrastructure plays an important role in the financial market development as it gives a significant satisfactory record for a proportion of the country's capital stock which result in deepening of financial systems greater diversification in trade and lower transaction cost (Regan 2017). According to Bradhan, Mallik and Bagchi (2018), the financial sector has involved many different alterations caused by computers and telecommunications. Bradhan *et al*. (2018) further explained that information and communication technology infrastructure are quickly growing as an important aspect in socioeconomic development, and therefore play an important role in lessening financial development challenges.

The enhancements in information and communication technology (ICT) give rise to development of new business models and it changes the financial trading systems which result in a decrease in transaction cost, while also improving the availability and accessibility of customers (Pradhan, 2015). In support, Chen, Gong, Chu and Cao (2018) confirm that infrastructure is a crucial element in improving financial system performance and assists investors to keep a continuous record of corporations which result in reduction asymmetric information. Bradhan *et al*. (2018) concluded that technological development makes it possible to transmit digitalised information locally and internationally. Hence, the more advanced the level of infrastructure in a country's economy, the better its chances of harnessing available funds for investment on the domestic financial markets.

2.4.2.6 Capital openness

Levine (2001) found that financial openness on international capital inflows increases stock market liquidity, which results in stock market development and liberalisation of international banks to operate in local country encourages adoption of modern banking skills and technology that improves the efficiency of domestic banking system. The idea of enabling financial systems to operate internationally by exposing financial markets to foreign capital promotes financial development by making it easier for investors to obtain

funds at lower cost because of extensive authorised capital stocks, increase in production and expanding incomes (Mishikin, 2007). The exposing of financial system to foreign institutions allows reforms in the financial systems by bringing advanced skills and knowledge, and outstanding practices, for instance, those created to identify acceptable credit risks and provide advice to borrowers on the amount of risk to take (Mishikin, 2007). Mishikin (2007) explained that foreign financial systems have a massive influence on the institution adjustment for domestic government since they are widely known of well-established markets and this improves the functioning of local financial systems. In addition, the financial reforms increase competitiveness in African countries and their existence is acknowledged worldwide (Kaushal and Pathak, 2015).

Zhang, Zhu and Lu (2015) used panel data for 30 Chinese provinces from 2000 - 2009 in consideration of different indicators of financial development, which are size, efficiency and competition. Through their empirical investigations, they found that financial and trade openness have an inverse relationship with the size of the market, but positively affect efficiency and competition of financial market development in China. Yilmaz, Fatma and Isil (2017) examined the impact of capital openness on financial market development. Yilmaz *et al*. (2017) concluded a positive relationship between financial and trade openness and the development of financial markets in both developed and developing countries. Similarly, Ayaydin, Karakaya and Pala (2018) investigated the impact of trade and financial openness on financial development, sampling 19 Eurozone countries with data spanning from 2000 to 2015 by applying the dynamic panel estimation technique (GMM) to evaluate the relationships amongst their key variables. Ayaydin *et al*. (2018) determined the existence of a significant link between financial openness, and the development in financial markets.

2.4.2 Institutional quality

Several scholars have concluded that a positive relationship exists between institutions and financial market development (Khan *et al*., 2020; Agyemang, Gatsi and Ansong, 2018; Aluko and Ajayi, 2018; Ho and Iyke, 2017). Although Le *et al*. (2016) had previously

concluded that high levels of improvements in institutions and legal systems influence financial system development; Khan *et al*. (2020) found that the rule of law negatively affects financial market development. The firmness of institutions such as financial regulation and the rule of law leads to shrinkage of financial markets.

On the other hand, Liu and Mikesell (2014) suggested that bureaucrats (the top government officials) increase corruption by allocating government resources to ineffective sectors, such as defense, that offers an opportunity for rent seeking. Hyun (2018) confirmed that institutions play an important role in mitigating corruption levels of a country by protecting investors from insiders who take advantage of opportunities to satisfy their interests and ensure that a conducive climate for investment are created. Corruption has become an argumentative issue among scholars on its contribution to the financial sector development.

According to Cooray and Schneider (2018), following the “sand the wheel” hypothesis, they concluded that corruption can be costly for the development in financial sector because it is a hindrance to increasing return on scale. Elaborating on this, Cooray and Schneider (2018) explained that countries where corruption is high, the rent-seeking practices turn out to be more attractive than fruitful activities that lead to reallocation of resources to rent-seekers. Reallocation of resources result in redirecting of credit from investors with beneficial investments opportunity to parties with political connections and thus corruption impedes investment and savings, which result in deficiency in financial sector development.

Bougatef (2016) study of the impact of corruption on loan portfolios of 22 emerging economies for the period 2008–2012 and concluded that corruption is a hindrance to the effective functioning of financial markets. In addition, shrinkage in financial markets is caused by high levels of corruption in the banking sector and the interference of political parties, which causes credit facilities to be allocated to unproductive and high roller activities. Son, Liem and Khuong (2020) conducted a study of 120 countries over the period 2004–2017 and concluded that corruption discourages the development of

financial markets by reducing the loan asset ratio and limit asset and liquidity growth. Haini (2019) asserted that changes in development of financial markets in worldwide countries differ due to the difference in institutional quality.

On the other hand, Aljazaerli, Sirop and Mouselli (2016) argued that corruption speeds up financial development and supported the idea of “grease the wheels” hypothesis. Goedhuys, Pierre and Tamer (2016) asserted that corruption plays an important role when there is instability in government systems and policies because it provides solutions to challenges that are associated with weak regulation and unnecessary bureaucratic delay which causes inefficiency in financial development. Missaoui, Brahmi and BenRajeb (2018) later argued that if ineffective bureaucracy is given illegal incentives, it becomes easier to acquire legal particulars such as permits and licences. Thus, corruption serves as a back entrance when institutions are inefficient and this results the in development of financial systems.

Governance is among the factors that are considered to impact on the development of financial markets of a country. Kaufmann, Kraay and Mastruzzi (2010) alluded that corporate governance is the cultural values and systems that are followed by a country to exercise its authority, and this includes the procedures that are followed to appoint, monitor and reinstate the government. The development of productive financial markets is determined the quality of institutional frameworks, especially the country-level governance framework (Le *et al*., 2016). Country-level governance plays an important role in the protection of property rights, good accounting practices, enforcement of contracts by ensuring that sound policies are formulated and implemented towards development of efficient financial markets (Abubakar, Mustaphaa and Ajiboyea, 2020).

According to Agyemang, Gatsi and Ansong (2018), the standards of regulations determine the level of financial market development in a country. They further discussed that developing countries experience difficulties in mobilisation and allocation savings in production investment as a result of the standards of regulation in place. Developing countries struggle to develop their financial systems because they operate in

poor regulatory environments Teker and Guner (2016). Kaidi, Mensi and Ben Amor (2018) indicated that countries with high quality of regulation environments engages small scale savers and investors by safeguarding them and this further improves the development of financial markets.

In support, Dima, Barma and Nachescu (2018) developed a law and regulation framework illustrating the importance of legal systems. According to their argument, countries holds different rules, which can contribute the level of financial development through, cooperate governance and the level of creditor protection. Arias, Maquieira and Jara (2020) argued that legal systems vary due to the way creditors and shareholders are managed, effectiveness of contract enforcement, which all contribute to financial development. Arias *et al*. (2020) continue to support the notion that effective legal systems impose private property rights and protect legal rights of investors, which encourages savers to inject funds in long-term schemes, and results in high levels of financial development. Specifically, the level of enforcement on property rights and investors protection affect the level of expropriation, and as a result, increase confidence in investors to buy securities and engage themselves in financial markets.

On the other hand, legal origin determines financial development. Fowowe (2014) and Asongu (2012) concluded that legal origin is a significant factor in financial development. Fowowe (2014) conducted a study in African countries and concluded that British legal origin countries have been proven to have a higher degree of financial development in comparison to those French legal origin. Ciobanu (2015) sampled 30 countries and investigated the influence of legal origin on financial market development. He concluded that countries that implement common law create business environments that entice investors to invest more than countries that practice the civil law.

The importance of legal traditions is backed up by many previous studies. According to Agyemang, Gatsi and Ansong (2018), poor legal systems and weak institutional structures discourage financial development mostly in developing countries. Aluko and

Azeez (2018) further explained that the inefficiency in economic system is due to poor performance in financial systems which result from lack of well-developed institutions

With regard to the existing literature, there is a substantial relationship between the property rights quality and the efficiency in financial market systems and their deepening. Dima *et al*. (2015) explained that the protection of creditors and shareholders from being dispossessed of their private property and their rights increases the prices of securities in financial markets and as a result, encourages large number of entrepreneurs to externally fund their projects, which causes development in financial markets. A large number of studies argue that the legal practices on property right protection and law enforcement on financial contracts encourages development in the financial sector (Psillaki and Mamatzakis, 2017; Anginer, Demirguc-Kunt, Huizinga and Ma, 2018; Arias, Maquieirab and Jara, 2020). In addition, Arias *et al*. (2020) assert that property rights increase the rate of “collateral benefits”, and the enhancement on property rights also enables investors to use their assets as an assurance on their loans. However, this improves the functioning of credit markets in developing countries where there are credit constraints and imperfection in the financial systems.

In the same manner, Liu and Jiang (2016) concluded that property rights have a positive impact on financial market development (and other measures of economic improvement). They further illustrate that as much as property rights positively influence financial development, contractual institutions have no influence on financial development and are not fundamental because agents can easily switch to different intermediation and terms of contract.

Yartey (2015) examined the determinants of stock market development in emerging economies and indicated that political stability has a significant influence on financial development in countries with strong institutional quality. In addition, they concluded that development in the banking sector results from well-balanced political systems as banks can generate more earnings. According to Mandon and Mathonnat (2015), the ruling system of a country government, which is either democratic or autocratic, is important for

financial development. They found that countries with democratic ruling system tend to have desirable financial development compared to countries with autocratic systems. Democracy helps to free the society from oppressive restrictions imposed by the authorities and encourages property right protection. In support of the idea of democracy as an important factor for financial development, Bartels (2016) found that democracy controls activities of interest groups that tend to benefit them by carrying out various assessment and balances which are proposed to scale down corruption. In support, Hira (2017) indicated that stability in political environments encourages financial development in the sense that investors can operate in their full capacity as protection is guaranteed. Hira (2017) alluded that stability in political environments is controlled by basic institutions that support investor's safety and this positively influence the level of financial development.

Along similar lines, the rule of law as part of the country-level governance framework has in the studies been considered to have a significant impact on the level of financial development (Agyemang *et al*., 2018). They further argued that rule of law is shaped with three characteristics that play a significant role in development of financial markets. The first characteristic incorporates the legal and political assurance of property rights and civil rights. Efficiency in a country judicial system forms the second characteristics of rule of law that ensures acceptable behaviour is maintained and transaction costs are maintained at a low level. The final characteristic of rule of law is the legal security and this ensures that individual's activities are in line with the stated rules which cannot be changed based on a personal whim. According to Agyemang *et al*. (2018), the above-mentioned elements give confidence to lenders and borrowers to engage in innovative investments in the financial markets. Aluko and Ajayi (2018) highlighted that countries that uphold and implement the rule of law provide more secure property rights, quality regulation and are effective in terms of downsizing bureaucratic problems and high tax compliance. Further, these countries are characterised by high judicial output and impartial judicial decision.

2.4.3 Measuring financial market development

Many scholars suggested several measures of financial market development and each indicator captures a different feature of financial development. An alternative measure of depth of a country's financial system as suggested by Makoni (2016), Muyambiri and Odhiambo, (2016), Aluko and Ajayi (2018), Makoni and Marozva (2018), as well as Le, Ho, Vu (2019), is the ratio of liquidity liabilities to the GDP. Liquid liabilities are broad money denoted by M3. Liquid liabilities are described as bank currency and total deposits plus electronic currency and transferable deposits plus time deposits, accumulated deposit, foreign currency convertible deposits, securities of repurchase transactions and security of money savings plus deposits in foreign currency, commercial papers, travellers' cheques and shares of market funds (Cihak, Demirguc-Kunt, Feyen and Levine, 2012). Forgha, Beloke and Mobit (2016) adopted the ratio of M3 to GDP as a financial depth indicator that is comprised of funds outside the banking sector and total demand and interest bearing liabilities of the banking sector and non-banking sector agents.

Another indicator of financial market development, as proposed by Guru and Yadav (2020), Tsaurai and Dzikiti (2019), Paun, Musetescu, Topan and Danuletiu (2019), is the ratio of credit to the private sector scaled by GDP. Guru and Yadav (2020) indicated that credit to the private sector to GDP is an important measure of financial market development because it takes into consideration the credit provided to the private sector that facilitates the employment and allocation of funds to more productive activities in the economy.

Forgha *et al*. (2019) proposed the ratio of stock market capitalisation to GDP as a measure of financial depth and size of the stock market. To measure the stock market development, we preferred to use market capitalization since it embodies the value of all listed companies on National bourses. Stock market capitalisation is a proxy of the ability of stock markets to allocate funds to productive investments and to protect market participants by providing opportunities for risk diversification (Forgha *et al*., 2019).

Ho and lyke (2017), Bayar, Yildirim and Kaya (2014), Bayraktar (2014) suggested the market liquidity indicator of value traded ratio which is calculated from the total value of shares traded in exchange markets as a ratio of stock market capitalisation. The value traded ratio measures how liquid the stock market is in terms of its ability to convert securities to cash. Higher level of liquidity encourages investment activities to happen since there is more efficient allocation of resources (Bayar *et al.*, 2014).

The banking sector development indicator, thus domestic private credit provided by commercial banks to GDP also measure the development of bond market development. Banks function as intermediaries and their existence is required for the development of a liquid and more efficient bond markets. Therefore, the banking sector and bond markets should operate as complement instead of substitutes. On a different note, both banking sector and bond markets serve as sources of external funds and this create competition between them which makes more sophisticated banking systems to dominate in the market share.

For the purposes of this study, all the individual measures of financial market development as they pertain to the bank credit, stock and bond markets will be applied, and gauged against the institutional quality variables. In addition to this, a composite index of financial market development will be developed using principal component analysis (PCA) and used to jointly gauge bank credit, stock and bond markets against institutional variables.

2.4.4 Measurements of Institutions and Institutional Quality

There are several databases available that capture the different variables of institutional quality. These include The International Country Risk Guide (ICRG), Kaufman, Kraay and Mastruzzi (KKM), and World Governance Indicators (WGI), Country Policy and Institutional Assessment (CPIA) and World Governance Assessment (WGA) However, for the purposes of this study, we will use the Kaufman, Kraay and Mastruzzi and World

Governance Indicators databases for which complete data is freely available at no cost to the researcher.

2.4.4.1 The KKM Worldwide Governance Indicators

Kaufmann, Kraay and Mastruzzi (2010) developed six worldwide governance indicators. The first governance indicator developed by Kaufmann *et al*. (2010) is Voice and Accountability. It is an important aspect of governance that represents the extent to which citizens can express and exercise their point of views, free to take part in the government selection process and free to media. Political stability and absence of violence or terrorism is the second governance indicator that determines the perception of the possibility of fluctuations in the political system or violence caused by politics which indicates terrorism.

The third governance indicator is Government effectiveness (GE). It is a governance indicator that captures the perception of the improvement of the services offered to the society, the improvement in civil services, the extent to which government separates itself from political burdens, the effectiveness in the formulation and implementation of policies, and the commitment of government to adhere to the policies (Kaufmann *et al*. 2010). Regulation quality is the fourth governance indicator that reflects the level at which the government effectively formulates and implements effective policies and regulations that stimulate advancement in the private sector.

The fifth governance indicator by Kaufmann *et al*. (2010) is the rule of law. This indicator measures the extent to which agents have confidence in abiding by the rules of society, and specifically to the quality of contract enforcement, property rights, the policy and the courts, together with the possibility of violence and crime. The sixth governance indicator is control of corruption. It captures the perception of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, and the capture of the state elites and private interest.

In addition, Mohamed, Ahmad and Khai (2016) described corporate governance as the process and structure that is used for directing and managing business' affairs in order to

improve business success and corporate accountability with the fundamental objective. However, Guha, Samanta, Majumdar, Singh and Bharadwaj (2019) elucidated that investors (both creditors and shareholders) are protected by legal practices of corporate governance build-up of laws and enforcement. The practice of corporate governance allows financial systems to raise more funds because investors tend to invest more in securities if they feel safe as their rights are protected by the law (Guha *et al*., 2019). Guha *et al*. (2019) further expounded that the development of financial markets is determined by the effective legal system approach because investors are safeguarded from expropriation, and a favourable environment is built for entrepreneurs.

2.4.4.2 World Bank World Governance Indicators (WGI)

The World Bank World Governance Indicators (WGI) scheme constructs aggregate and standardized indicators of the listed variables which are comprehensive dimensions of governance. These indicators, which are the same as those described by Kaufmann *et al*. (2010) are: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, the Rule of Law and, finally, Voice and Accountability.

In this study, in order to assess which institutional quality measure has a greater bearing on FMD, all six factors from the KKM governance indicators were individually regressed against the FMD variables. In addition, we constructed a composite index of institutional quality to assess the collective influence of the governance factors on financial market development in our sample of African countries. Further to this, we did the same using the World Bank's World Governance Indicators (WGI). This is because the variables and databases differ in their measurement and there is a possibility of different findings being yielded. As such, we would like to highlight these differences, and the outcomes thereof.

2.5 Chapter summary and Conclusion

This chapter has provided literature related to financial market development and institutional quality in selected African countries. We discussed key variables that include

financial openness, economic growth rate, inflation rate amongst others and their contribution to financial market development. The study also reviewed the main theories applicable to the study. The next chapter presents the methodology adopted to address the research objectives of this study.

Chapter 3: Methodology

3.1 Introduction

The chapter aims to present a comprehensive explanation of the data and methodology applied in the study. The first part of the chapter gives a synopsis of the data sources and sample size. The empirical models adopted are specified, and the econometric techniques employed in estimating the model and the diagnostic tests to be performed are also discussed in detail. A brief summary on Granger causality testing winds up the chapter.

3.2 Data and variables

This research study used secondary statistical data collected from the World Development Indicators (WDI), the World Governance Indicators (WGI) and the Kaufmann, Kraay and Mastruzzi (KKM) databases, respectively. The World Bank's WDI provided the financial and economic statistics, while the WGI and KMM provided access to institutional quality variables. This data was deemed adequate to assist the researcher to have a better understanding and determination of the relationships that exist between financial market development and institutions in the selected African countries under study.

Although Africa is comprised of 54 countries, this study is primarily confined to a small sample of ten African economies, namely, South Africa, Nigeria, Egypt, Cameroon, Morocco, Kenya, Mauritius, Botswana, Namibia and Ghana. This is because they are the leading African economies in terms of economic growth, as well as most successful in terms of attracting both domestic and foreign investors targeted at the financial markets. The countries were also purposely selected on the basis of data availability for the period under review. We demarcated the period of interest to 2009 – 2017, as we consider it a reasonable time span to draw relevant conclusions on. This period covers the tail-end of the most recent global financial crisis which affected both local and international financial markets, and highlighted weaknesses of governance and institutional structures.

Table 3.1 below depicts the variables adopted for this study, as well as the expected outcomes from our study.

Table 3.1: List of variables

Variables	Data Source	Citing literature source	Expected outcome
Dependent variable			
Stock market capitalisation (stock market capitalisation as % of GDP) (SMCAP)	World Bank WDI	Shabbir, Jamil, Bashir, Aslam, and Hussain (2018); Badeeb and Lean (2017)	Positive
Liquidity liabilities of financial systems (M3 to GDP) (LL)	World Bank WDI	Le, Ho, Vu (2016); Makoni (2016); Muyambiri and Odhiambo, (2016); Makoni and Marozva (2018)	Positive
Stock market value traded (Total value as % of GDP) (SMVT)	World Bank WDI	Ho and lyke, (2017), Bayar, Yildirim and Kaya (2014); Bayraktar, (2014)	Positive
Domestic credit to the private sector by deposit banks as a share of GDP (DC)	World Bank WDI	Guru and Yadav, (2020), Tsaurai and Dzikiti, (2019); Paun, Musetescu, Topan and Danuletiu (2019)	Positive

Independent variables			
Capital openness (KAOPEN)	World Bank WDI	Bayar, Akyuz, and Erem (2017); Mahawiya (2015); Barnor and Wiafe (2015)	Positive
Control of Corruption (CoC)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Negative
Voice and Accountability (VoA)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Positive
Governance Effectiveness (GoE)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Positive
Rule of Law (RoL)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Positive

Political Stability and Absence of Violence (PoS)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Positive
Regulatory Quality (ReQ)	KMM World Bank WGI	Aluko and Ajayi (2018); Agyemang, Gatsi and Ansong (2018); Kaufmann *et al*. (2010); World Bank WGI	Positive
Control variables			
Inflation % change in GDP deflator (INF)	World Bank WDI	Asab and Al-Tarawneh (2020); Mahyar (2017); Mahawiya (2015),	Negative
Real GDP growth rate (GDPG)	World Bank WDI	Bekhet and Al-Smadi (2015); Otchere, Soumare and Yourougou (2015)	Positive
Real exchange rate (RXR)	World Bank WDI	Conrad and Jagessar (2018); Nguyen, Ali, and Penkar (2015);	Negative
Real interest rate (RIR)	World Bank WDI	Eldomiaty, Yasmeen Saeed, Hammam; Mbulawa, (2015).	Positive
Infrastructure Log (phone lines per 1,000 people)	World Bank WDI	Ibrahim, Adam and Sare (2018); Makoni (2016)	Positive

Source: Author's own compilation

3.2.1 Financial market development variables

To avoid challenges that are faced when performing a direct measurement of financial development, researchers such as Tsaurai and Dzikiti, (2019); Paun, Musetescu, Topan and Danuletiu (2019); Qamruzzaman and Wei (2018); Badeed and Lean (2017); have taken some precaution by using proxies. Thus, in order to avoid these challenges, this empirical study also adopted one of the justifiable financial development measurements by Kar and Pentecost (2000).

3.2.1.1 Dependent variables

Stock market development has many different aspects that consist of various measures and indicators which include stock market liquidity, volatility, concentration and the regulation in the markets (Garcia and Lui, 1999).Stock market development is determined by its size as measured by stock market capitalisation. Stock market capitalisation, measured as the ratio of stock market capitalisation to GDP, is considered as the most dominant measurement as it is less subjective compared to other individual measures (Garcia and Lui, 1999). According to Garcia and Lui (1999), stock market capitalisation is the value of all listed shares divided by GDP and it measures the size of stock market in relation to that of the economy.

Levine (1997) considers stock market value traded as the measurement of stock market liquidity. According to Levine (1997), the indicator, the stock market value traded, measures stock market liquidity and this is represented by the total value of shares traded expressed as a percentage of GDP. In other words, it measures the degree of trading in comparison to the size of both the economy and the stock market, and how the two measures complement each other (Garcia and Lui, 1999).

M3/GDP is used as a measurement of financial development, thus presenting the liquidity of financial systems. This indicator has been widely used in several studies of financial development including the studies of Levine *et al.* (2000), Rousseau and Watchel (2000), and Beck and Levine (2005). According to Levine (2002), liquidity liabilities indicate the standard measure of overall size of the banking sector. Broad money consists of currency held outside the bank system plus interest bearing total deposit liabilities of banks and

non-bank financial intermediaries. This study applied M3 instead of M1 and M2 to measure the size of the banking sector because it is a more comprehensive measure. M3 includes currency, demand deposits, all time deposits, and the liabilities of money market mutual fund (Rousseau and Watchel, 2000).

To measure bank development, we followed Levine *et al*. (2000) and used domestic credit to private sector, which is defined as the credit issued to the private sector by banks such as loans, trade credits and other receivable accounts that establish a claim for repayment. According to the World Bank (2020), domestic credit to private sector is the most inclusive indicator of processes of the deposit money bank. The appropriateness of this measurement is also confirmed by Beck, Levine and Loayza (2000), who explained that the domestic to private sector is a better proxy for financial intermediary development because it does not take credit to public sector into account, and yet captures the degree of efficiency resource allocation. This financial intermediation development indicator is presented as domestic credit to private sector and other financial intermediaries divided by GDP, excluding credit issued to government and public enterprises, as well as the credit issued by the monetary authority and development banks (Huang, 2010). Domestic credit to private sector measures general financial intermediary activities provided to the private sector only (Huang 2010).

3.2.2 Independent variables

Institutional quality indicates the standards of governance and it is a proxy for economic institutions. This is represented by the KKM index developed by Kaufmann, Kraay, and Mastruzzi (2010). According to Kaufmann *et al*. (2010), institutional quality is determined by six governance indicators being: voice and accountability, political stability, absence of violence/ terrorism, government effectiveness, regulatory quality, rule of law and control of corruption. This is also related to the studies of Aluko and Ajayi (2018); Le, Kim and Lee (2016); Makoni (2016) which employed the KKM governance indicators to determine institutional quality. Le *et al*. (2016) found that each country scores a value between 0 and 100, identified by employing the percentile ranking method. The indicators, voice and accountability, political stability, absence of violence/ terrorism, government effectiveness, regulatory quality, rule of law and control of corruption were derived from the World

Governance Indicators (WGI) database which ranks countries on six aspects of good governance. The WGI is widely used in development policy discussion and in scholarly research. This study also applied the six World Bank governance indicators to determine the role institutional quality plays in financial market development.

Girma and Shortland (2008) stressed that political stability is viewed as a crucial factor of level of financial market development. Girma and Shortland (2008) further urged that political stability improves the performance of banks as they can generate more profits. In addition, Roe and Siegel (2011) indicated that political stability has a significant positive influence on the level of financial markets development because it encourages the economy to institute and uphold the protection of investors.

Corruption, as a national level governance framework, has an impact on many aspects of an economy, for instance, the foreign direct investments, productivity and income inequality. Aljazaerli, Sirop and Mouselli (2016) pointed out that the well-functioning of financial markets is shaped by the level of corruption that reigns in the economy. The presence of corruption in financial markets can reduce savings and discourage investors and this can give rise to an economy exposed to financial crises (Aljazaerli *et al*., 2016).

Rule of law has been considered to have an influence on the level of financial market development in an economy. In financial markets, the rule of law has three significant features (Agyemang, Gatsi and Ansong, 2018). Firstly, it comprises of legal and political guarantees of property rights and civil liberties. Secondly, it guarantees that the judicial structure in a country is well balanced and, in this way, inhibits predatory behaviour and lower transaction cost. Lastly, legal security represents the third element of the rule of law and implies that nationals can settle their goals within the structure of creditable rules that will not be optionally changed. These above-mentioned features increase lenders and borrowers' confidence to chase after more advanced financial contracts in the financial markets (Chimi and Russell, 2009). The exercising of the rule of law provide more protection to property rights, efficient regulation, and effective in relation to reduction of bureaucratic delays and high tax compliance (Chimi *et al*., 2009). However, this can lead

to high judicial results and impartial judicial decisions (Lubna, 2011).

Further, regulatory quality has a significant impact on financial market development. The improvements in regulatory quality encourages mobilisation of savings and channelling them efficiently and effectively into more profitable investments (Agyemang *et al*., 2018). Failures in the financial markets in developing economies stem from the fact that a number of developing economies are defined by poor regulatory environment (Gani and Ngassam, 2008). Regulatory quality improves the performance of financial markets by encouraging competitive environment, exchange, intermediation, and arbitrage (Johnson, 2011).

The extent of government effectiveness and voice and accountability also affect the performance of financial markets (Gani and Ngassam, 2008). Government effectiveness specifies the ability of a nation's government to develop and implement policies (Hooper, Blasi and Serpico, 2009). Further, government effectiveness deals with standards of public service delivery and bureaucracy, ensuring civil services do not rely on political forces and the government commitment to policies. High levels of government effectiveness help in solving collapsing markets and promote financial market development by making funds available and affordable to investors, achieved by lowering borrowing cost. In addition, the level of voice and accountability contribute to efficient functioning of financial markets (Agyemang et al, 2018). Disempowered small savers and investors may be unable to hold their managers accountable, they may rather channel their resources elsewhere (which may have a negative impact on the development of financial markets (Agyemang *et al*., 2018).

Control variables

Capital openness shows the extent to which a country allows capital flows and is determined by employing the KAOPEN index developed by Chinn and Ito (2008). The KAOPEN index is published in the IMF's (2018) Annual Report on Exchange Arrangements and Exchange Restriction (AREAERS) which indicated that the index is

the first systemised principal component with four international financial transaction restrictions. These restrictions specify the presence of multiple exchange rates, current account restrictions, restrictions on capital account transactions and the requirement to surrender of exports earnings (Chinn and Ito, 2008). The Chinn and Ito KAOPEN index value ranges between zero and one, thus high index value shows that a country has greater financial openness to international capital transactions (Chinn and Ito, 2002).

Real Gross Domestic Product Growth rate has been found to be the most important microeconomic factor, among others, that influences financial market development (Karki, 2018). However, GDP growth is used as the most efficient indicator for real aggregate economic activity in the economy (Karki, 2018). The real GDP growth rate is among the variables to be employed in this study for the purpose of wealth control effects.

The World Bank (2016) defined *inflation* as the rate at which the general price of goods and services in an economy are rising and eventually purchasing power falls. Inflation, measured as the annual growth of the GDP deflator, is included because inflation is found to have an adverse effect on the effective functioning of financial systems since it interferes with the development process of the sector. Boyd, Levine and smith (2001) however, cautioned that inflation can mislead the economic agents' decision making about nominal magnitude, creating difficulties on financial intermediation and promoting savings in real assets.

Interest rates are determined by lending rates, deposits rates and interest rate speed. Past studies indicate that interest rates affect both supply and demand. According to Nguyen, Ali and Penkar (2015), an increase in deposit rates encourages savings, which are as a result invested into economy. In several cases, an increase in lending rates discourages borrowing for investment in efficient assets (Beck and Cull, 2013). Therefore, extensive interest rate spread possibly hinders the development of banks, thus lowering financial market development.

Exchange rates are determined by three measures, that is the period average national

currency exchange rate per US dollar; the end period national currency exchange rate per US dollar; and the nominal effective exchange rate. According to the International Monetary Fund (2015), a shift in exchange rate greatly influences exports and imports, and consequently economic growth and financial development.

Infrastructure encourages productivity and distribution of goods and services, and therefore it is likely to have an impact on financial market development (Okeahalam, 2005).To determine the measurement of infrastructure, we used the number of fixed and mobile telephone subscribers per 1000 people of population (telephone per 1000).

3.3 Econometrics

3.3.1 Regression Analysis

This section presents the econometric methodology in sequential order to address our research objectives as stated earlier in the study. The dependent variable in this study is financial market development (FMD), determined by constructing a principal component analysis (PCA). The study used a multiple regression model run by applying the Ordinary Least Square (OLS) method. This technique was introduced by Gauss in1975 and is a well-known statistical approach applied to estimate the relationship between two variables. In this situation, the OLS was used to estimate the relationship between financial market development and its determinant and control variables such as institutional quality, capital openness, infrastructure, GDP, inflation, real interest rate and real exchange rate. In addition, it estimates whole importance of the model using the t-Test and f-Test, respectively. The t-test statistic, developed by Gosset in 1908, is generally applied to determine the importance of each independent variable in explaining the dependent variable, which is financial development in this study. On the other hand, the f-test used by George and Ronald in1920 is usually employed to determine the suitability of the model.

3.3.2 Pre-diagnostic tests

3.3.2.1 Autocorrelation

Autocorrelation is a pre-diagnostic test we used on our model to eliminate the violation of the classical assumptions associated with OSL estimators. According to Gujarati (2003), autocorrelation can be considered as an interconnection among the remaining of a time series data which provides the OLS estimators is no longer unbiased, for instance, unbiased of small difference for available values of the parameters. Gujarati (2004) indicated that the autocorrelation may be encountered in a panel data as a result of unclear description of the model, distortion in measurement and missing of variables in a model.

Wooldridge (2002) tested for serial correlation to determine the existence of autocorrelation in a linear series data. Wooldridge (2002) alluded that standard errors and ineffective parameter estimates are usually experienced when the serial correlation in the idiosyncratic error term is not taken into consideration. The Durbin-Watson was applied to determine the first order to test for error and its immediately previous value (Durbin and Watson, 1951). We used the Durbin-Watson test for the non-existence of autocorrelation by using the residuals of the model considering that the independence of residuals is one of the fundamental hypothesis of regression analysis.

3.3.2.2 Heteroscedasticity

Brooks (2008) indicated that the general assumption behind the linear regression is that the difference of the error term is a constant and it is represented as Var $\mu_t = \sigma^2 < \infty$. This assumption is introduced as the homoscedasticity. The existence of the homoscedastic occurs when there is a constant difference in the error term. An alternative regular statistical test for homoscedasticity is White's (1980) general test for homoscedasticity. The White (1980) homoscedasticity test is more advantageous in that it provides a small number of assumptions on homoscedasticity model. The primary assumption on the regression model is that it is assumed to linear. The White (1980) model tests for errors which are assumed to be both homoscedastic and independent of the regressors, and it eliminates the challenge of model misspecification. The regression

test is performed by regressing every single cross variable of the residuals. The null hypothesis in the White (1980) test mode result from the errors that are homoscedasticity. Homoscedasticity exist when the null hypothesis is not rejected, and heteroscedasticity exist when the hypothesis is rejected.

3.3.2.3 Normality

According to Brooks (2008), the normality assumption is much needed for the purpose of performing a single or joint hypothesis test on the model parameters and it is represented as ($\mu_t \sim N(0, \boldsymbol{\sigma^2})$). A normal distribution is characterised as symmetric on its mean and it is considered to be mesokurtic, implying that the distribution has zero Kurtosis. The Bera-Jarque test is the most frequently used test to determine normality. The Bera-Jarque applies the feature of a normally distributed random variable which shows that the whole distribution is distinguished by the pair, the mean and the variance. Its test statistic asymptotically applies a X^2 distribution using the null hypothesis which indicates that the distribution of the series is symmetric. The null hypothesis of normality can potentially be rejected provided that the residuals from the model are either importantly skewed or leptokurtic/platykurtic (or both).

3.3.2.4 Multicollinearity

Multicollinearity arises when one or several independent variables are correlated to each other in a regression equation. One of the issues associated multicollinearity is that it reduces the statistical importance of an independent variable (Allen, 1997). All things being equal, the higher the value of the standard error of a regression coefficient, the lower the chances of the coefficient to be statistically important (Allen, 1997). Kumari (2008) concluded that the existence of a linear relationship in two or more variables shows perfect multicollinearity.

3.3.3 Principal components analysis

For the purposes of testing for robustness of our estimates, we used Principal Components Analysis (PCA) to develop single composite measures for financial market

development and institutional quality, respectively. PCA is a technique which applies the orthogonal transformation to change group of selected correlated variables into a smaller group of linearly uncorrelated variables (Jolliffe, 2005). According to Badeeb and Lean (2017), principal components analysis is a basic technique used to reduce complex sets of data to a small set that still captures the relevant information of the larger set. Principal components analysis is regarded as the most efficient technique in determining the maximum weights of variables when compared to other techniques in which variables are given balanced or subjective weights (Badeeb and Lean, 2017). The application of the PCA technique was deemed suitable to provide the accurate status of financial market development and institutional quality of the countries under study, as this would probably not have been adequately captured by the individual variables.

3.4 Testing cointegrating and causal relationships between financial market development and institutional quality in selected countries.

3.4.1 Unit root test

Cointegration of variables is concluded when there is linear combination between non-stationary variables, thus there is need to test for stationarity in the series. Time series is regarded as stationary if the mean and variance of the series are constant over time and do not tend to shift (Paramaiah and Akway, 2008). On the other hand, if the above-mentioned state is not attained, then the series is non-stationary (Paramaiah and Akway, 2008). Tests of stationarity are applied to specify unit root in the variable (Gujarati, 2004).

The presence of unit root test in data series is achieved by applying the most commonly used tests, namely, Levin, Lin and Chu (LLC) test, Im, Persaran and Shin (IPS) test, Augmented-Dickey-Fuller (ADF) test and the Philips and Perron (PP) unit root test.

Levin and Lin (1992, 1993) and Levin, Lin and Chu (2002) unit root test, abbreviated by LLC henceforth, presents different findings on panel unit root test. Levin and Lin (1992, 1993) and Levin, Lin and Chu (2002) take into consideration the heterogeneity of individual deterministic effects (constant and/or linear time trend) and heterogeneous serial correlation patterns of the error terms, assuming homogeneous first order

autoregressive parameters. The LLC model is simply illustrated as a three-stage process with preliminary regressions and normalisations required by cross-sectional heterogeneity.

According to Hsiao (2003), the LLC indicates that the essential features of the regression estimators and test statistics are a combination of elements obtained for stationary panel data, and elements obtained in the time series literature on the unit root test in comparison to the non-standard distributions of unit root test statistic for single time series for Phillips (1987), Philips and Perron (1988) with a restricting regular distributions of the panel regression measures and test statistics in regard to stationary panel data. One of the limitations with LLC is that the tests are grounded on the independence assumption in all individuals, therefore is not relevant provided the cross-sectional correlation exist. However, this drawback is resolved by the well-known Im, Pesaran and Shin test (1997, 2003).

According to Maddala and Wu (1999), the IPS test is defined as the mixture of the test statistics proof of many independent unit root tests. Im, Persaran and Shin (2003) proposed a different, and easily computed unit root testing process for panel, also known as the t-bar statistic, that enables simultaneous stationary and non-stationary series. In addition, the IPS test enables for serial correlation and heterogeneity of the movements and error variances in all groups. The null hypothesis is that all individuals follow a unit root process:

$$H_0: \rho_i = 0 \; \forall \; i$$

A different hypothesis enables some, however not all of the individual to have unit root:

$$H_1: \begin{cases} \rho_i < 0 \; for \; i = 1,2 \ldots., N_1 \\ \rho_i = 0 \; for \; i = N_1 + 1.., N \end{cases}$$

When $t_{\rho i}$ is the individual t-statistic for testing the null hypothesis: $\rho_i = 0$ for all i, then the test is based on averaging individual unit root tests $\bar{t} = \frac{1}{N} \sum_{i-1}^{N} t_{\rho i}$. If this statistic is correctly normalised, it is asymptotically N (0, 1) distributed. Monto Carlo simulations show that the

small sample performance of the Im-Pesaran-Shin test is more enhanced than the Levin-Lin-Chu test. Im-Pesaran-Shin requires N/T → 0 for N → ∞. If either N is small or if N is large relative to T, then both Im-Pesaran-Shin and Levin-Lin-Chu show misrepresentation in size. Apart from this, the tests have limited power if deterministic terms are embedded in the analysis.

The Augmented Dickey-Fuller (ADF) test manages for higher order correlation by including the lagged difference terms of the dependent variable to the right-hand side of the model (Mohanasundraram and Karthikeyan, 2015). The Augmented Dickey Fuller is presented as follows:

$$\Delta \boldsymbol{Y_t} = \boldsymbol{b_0} + \boldsymbol{\beta Y_{t-1}} + \mu_1 \Delta_{\boldsymbol{t-1}} + \mu_2 \Delta \boldsymbol{Y_{t-2}} + \ldots\ldots + \mu_{\boldsymbol{p}} \Delta \boldsymbol{Y_{t-p}} + \mu_{\boldsymbol{t}} \quad \textbf{\textit{(3.1)}}$$

Where $\boldsymbol{Y_t}$ donates the time series to be determined, $\boldsymbol{b_0}$ represent the intercept, $\boldsymbol{\beta}$ represent the coefficient in the unit root test, $\mu_{\boldsymbol{p}}$ is the parameter of the augmented lagged first difference of $\boldsymbol{Y_t}$ represent the p^{th} order auto regressive process and $\mu_{\boldsymbol{t}}$ **t** is the white noise error term.

Philips and Perron (1988) proposed the unit root test which Vacu (2013) found not much different from the ADF test, as it enables for autocorrelated residuals through non-parametrical statistical methods. Asteriou and Hall (2011) described three situations upon which decisions on stationarity are based. First scenario, the cointegration of variables is deduced when all variables incorporated in the time series data are reported to be stationary at level I(0). The second scenario described by Asteriou and Hall (2011) is the absence of cointegration between variables when variables are integrated of different order, and the last is a scenario whereby variables are integrated of the same order, therefore enabling a cointegration test to be carried out.

Although we have discussed various ways available to determine the presence of a unit root, our study applies the augmented Dickey-Fuller (ADF), Levin, Lin and Chu (LLC) and

the Phillips-Peron (PP) unit root tests because they are based on a cross-sectional independence hypothesis.

3.4.2 Cointegration model: ARDL

The cointegration approach pioneered by Granger (1988) is a multivariate problem which reveals the existence of a long run relationship between variables. The primary notion behind the cointegration concept is that non-stationary variables are considered to be cointegrated when the difference between them is stationary, thus existence of long run equilibrium relation is concluded (Granger, 1988). On the other hand, the non-existence of cointegration indicates that such variables have no long run relationship, and they swiftly diverge from each other (Dickey, Jansen and Fuller, 1991)

In order to determine the long run and short run causality relationships between dependent and independent variables, a number of integration test are adopted. One can apply the two-step approach developed by Engle and Granger (1987), the vector autoregressive (VAR) approach developed by Johansen (1988), or the ARDL bounds test approach developed by Pesaran and Pesaran (1997).

3.4.2.1 Engle-Granger Two-step Method

Engle and Granger (1987) developed a methodology for testing of cointegration that follows a two-step estimation relying on the residual of the estimate model instead of the initial data. The Engle-Granger first step ascertains that every single variable holds one root. This is succeeded by estimation of cointegrating regressions by employing the least square method which enables us to check for stationarity of the residuals from the regression. In the event that stationarity is concluded, the second step is carried out but given that they hold one unit root, a model having only first differences is measured. The second step measures the error correction model which indicates the short run movement of the model by making use of the residuals from the first step as a single variable.

There are a considerable number of shortcomings that are associated with the Engle-Granger step two approach. Brooks (2008) pointed out that when causality between two

variables moves in either direction, there are more possibilities of simultaneous equation bias. However, the researcher is bound to consider both variables asymmetrically, despite the absence of theoretical grounds to do so. The other shortcoming arises from the fact that it is not feasible to carry out any cointegration test given that there are multiple cointegration relationships and common limited sample problems of a weakness in unit root and cointegration test. Once more, it is not feasible to carry out any hypothesis tests concerning the existing cointegration relationship. Finally, the Engle-Granger approach is associated with residual cointegration test which is inefficient and may result in inconsistent results, particularly when the number of variables in question exceeds two I(1) (Pesaran and Shin, 1999). Considering the above-mentioned weakness, the Autoregressive Distributed Lagged is most preferred to the Engle-Granger Approach.

3.4.2.2 Johansen technique based on VAR

The Johansen technique is a procedure for testing for cointegration of a minimum of two variables which follows an integration order of I(1). In simple terms, the Johansen technique enables the existence of multiple cointegration relationships. For the purposes of determining cointegration relationship between variables, the Johansen technique employs a vector autoregressive model (VAR).

The Johansen maximum likelihood co-integration technique is adapted to determine the presence of co-integration and the number of co-integrating vectors (Johansen, 1988; Johansen and Juselius, 1990). Therefore, Johansen (1988) suggested two different likelihood ratio tests which are the trace test and the maximum eigenvalue test.

The Johansen model is generally associated with challenges of selecting the deterministic components of the model (Xu, 2012). For instance, if the deterministic components (constant or time trend) are embodied in levels of data or cointegration equation. This really matters because cointegration can be sensitive to the empirical specification of the deterministic component and the spread of the test statistics is different for each possible combination (Xu, 2012).

3.4.2.3 Autoregressive Distributed Lagged (ARDL) model

We applied the Autoregressive Distributed Lagged (ARDL) introduced by Pesaran, Shin and Smith (2001) because it is suitable for limited sample data, as is the case in this study. The ARDL has been found to have higher level performance and can still present robust results linked to the cointegration analysis (Narayan, 2005). It eliminates the difficulties encountered when establishing the order of integration amongst variables (Narayan, 2005). In addition, it gives a difference between dependent and explanatory variables, and enables to check for the presents of relationship between variables.

To determine the presence of cointegration between variables, we consider the following ARDL model**:**

$$\begin{aligned}\Delta lnFD_{it} = \gamma_0 &+ \sum_{i=0}^{n} \gamma_{1i}\, \Delta lnFD_{it-1} + \sum_{i=0}^{n} \gamma_{2i}\, \Delta lnINSTQ_{it-1} + \sum_{i=0}^{n} \gamma_{3i}\, \Delta lnKAOPEN_{it-1} \\ &+ \sum_{i=0}^{n} \gamma_{4i}\, \Delta lnINFR_{it-1} + \sum_{i=0}^{n} \gamma_{5i}\, \Delta lnGDP_{it-1} + \sum_{i=0}^{n} \gamma_{6i}\, \Delta lnRER_{it-1} \\ &+ \sum_{i=0}^{n} \gamma_{7i}\, \Delta lnIR_{it-1} + \delta_1 lnFD_{it-1} + \delta_2 lnINSTQ_{it-1} + \delta_3 lnKAOPEN_{it-1} \\ &+ \delta_4 lnINFR_{it-1} + \delta_5 lnGDP_{it-1} + \delta_6 lnRER_{it-1} + \delta_7 lnIR_{it-1} + \varepsilon_{it}\end{aligned}$$

(3.2)

Where $\varepsilon, \gamma \text{ and } \delta$ are the white noise residuals, the short term coefficient and the long run coefficient in the equation; Δ denotes the first difference operator, *t* represents the time period, *i* is the country, *n* is the highest number of lags in the equation. The following variables $lnFD, lnINSTQ, lnKAOPEN, lnINFR, lnGDP, lnRER, lnIR$ are the natural logarithm of the financial market development, institutional quality, capital openness, infrastructure, real GDP, real exchange rate and interest rate, respectively.

The dependability of the estimates of (3.2) is based on the joint importance of the coefficients$\delta_1\ \delta_2\ \delta_3\ \delta_4\ \delta_5\ \delta_6\ and\ \delta_7$. This basically means that the variables in equation (3.2) should be cointegrated so that it is possible to estimate coefficients effectively. However, the presence of cointegration can be confirmed by testing the null hypothesis of the non-existence of a cointegrating relationship:

$$H_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \ \delta_7$$

Pesaran, Shin and Smith (2001) developed two sets of important values, which the first set of the values are determined by giving an assumption that (3.2)variables are integrated of order zero, I(0), whereas set two values are determined by assuming that they are integrated of order one, I(1). The null hypothesises of non-existence of integration is accepted when the *f*-statistic falls under the first set of values. Equally, the null hypothesis of non-existence of integration is rejected when the calculated *f*-statistic is above the second set of values. However, inconclusive results are obtained when the *f*-statistic lies between the two sets of values.

3.4.3 Error correlation model (ECM)

When cointegration exists for the long run relationships, we then move on to estimate the short run relationships of variables by employing an error correction model presented as:

$$\begin{aligned}\Delta lnFD_{it} = \gamma_0 &+ \sum_{i=0}^{n} \gamma_{1i}\, \Delta lnFD_{it-1} + \sum_{i=0}^{n} \gamma_{2i}\, \Delta lnINSTQ_{it-1} + \sum_{i=0}^{n} \gamma_{3i}\, \Delta lnKAOPEN_{it-1} \\ &+ \sum_{i=0}^{n} \gamma_4\, \Delta lnINFR_{t-1} + \sum_{i=0}^{n} \gamma_{5i}\, \Delta lnGDP_{it-1} + \sum_{i=0}^{n} \gamma_{6i}\, \Delta lnRER_{it-1} \\ &+ \sum_{i=0}^{n} \gamma_{7i}\, \Delta lnIR_{it-1} + \delta ECM_{it-1}\end{aligned}$$

(3.3)

Where δ is the coefficient of the error-correction term, ECM_{t-1}. δ is expected to have a

negative sign. This means that the variable can swiftly shift to their equilibrium position if they change from their equilibrium position in the short run.

According to Phillips (1957), the error correlation model is a technique employed to make some corrections on the policy tool in order to uphold the target variable not far from expected value. Hendry, Pagan and Sargan (1984) also described the ECM as a model which forms an integral part of the dynamic linear regression model and it forces a long-run balance, thus linear homogeneity, within some regressors. The Error Correlation Model (ECM) is regarded as a significant model by Asterou and Hall (2007), and they specified the importance by giving four reasons. The first justification is that ECM is a convenient model determining the correction from disequilibrium of the past period which has a positive economic effect. Apart from this, if there is no existence of cointegration, the ECMs are developed with regard to the first differences which generally excludes trends from engaged variables and for this reason they overcome the issues of false regression. The second benefit is that the ECMs are most simple model whereby they can suit into general-to-specific technique to econometric modelling, which can be a search for a more economical ECM model perfectly matches the available data sets. The last significant aspect of the ECM model is that the disequilibrium error is fixed, which implies that there are some correction processes which ensures that the errors in the long-run relationship cannot increase.

The Error Correction Model approach involves testing stationarity of variables through carrying out a cointegration analysis and developing a Vector Error Correction model (VECM) to evaluate the short-run and long-run relationships of cointegrated series, as well as Granger causality between variables (Ghirmay, 2004). This approach takes into consideration the short-term adjustments of the variables, together with the rate of adjustment of the coefficients. The VECM takes account of the rate at which variables will go back to their equilibrium as a result of a short-term shock to all of them (Brooks, 2008). However, this model is suitable for macroeconomics and financial data since it tells a difference between stationary variables with temporary effects and non-stationary variables with invariable effects (Brooks, 2008).

Suppose that yt and xt are cointegrated, the model can be presented as follows:

$$\Delta y_{it} = \beta_1 \Delta x_{it} + \beta_2 (y_{it-1} - yx_{it-1}) + \mu_{it} \quad (3.4)$$

Where $y_{it-1} - yx_{it-1}$ denotes the error correction term and *y* represents the long-run relationship between *x* and *y*. The correlation model is explained as: *y* is supposed to change between t-1 and as a consequence of this, *t* changes in the values of the explanatory variable(s), *x*, between *t*-1 and *t*, as well as to rectify any disequilibrium that occurred in the past period. The error correlation turns out with a lag. There is little chance for the term to turn out without any lag which would indicate that *y* changes between *t*-1 and *t* in reaction to a disequilibrium at time *t.* β_1 defines the short-run relationship between changes in x and changes in y, whereas β_2 defines the rate of adjustment returning to equilibrium.

3.5 Testing for Granger causality between financial market development and institutional quality

We proposed to use Granger causality testing to assess whether institutional quality drives financial market development (FMD) or is it FMD that drives institutional quality. The Granger causality test investigates if past changes in a single variable help to explain current changes in another variable, or if it is irrelevant. According to Comincioli (1996), Granger causality testing was developed by Granger in 1969 with the main aim of testing statistical causality between variables. Granger (1969) proposed that X causes Y, if the previous value of X is used to forecast exactly the value of Y. This implies that if the previous value of X makes a better forecast of value Y, then it is deemed that X Granger causes Y.

Granger causality was employed in our study for the purpose of testing hypotheses in relation to the existence and direction of causality between financial development and

institutional quality. According to Afsar (2008), the relationship between variables using Granger causality has three distinctive directions:

- One-way causality: In this single equation model, Y is the dependent variable and X independent. Here, there is a causality relationship from X towards Y (X⇒Y)
- Two-way causality: There can be a reciprocal effect between variables. (X ⇔Y).
- Lack of Causality: There is no relationship among variables, therefore no causality.

3.6. Chapter summary and conclusion

This chapter presented the methodological footprint for the study. It discussed in detail the data, variables and sources used. It further outlined the econometric models and pre-diagnostic tests employed to address our research objectives as stated earlier in the study. Lastly, the cointegration and granger causality aspects of our study were articulated. With this research methodological framework at hand, the next chapter is specifically dedicated to the presentation of data, data analysis and discussion of findings from our empirical investigation thereof.

Chapter 4: Data analysis and discussion

4.1 Introduction

This chapter presents the empirical findings, data analysis and discussion thereof, as per our stated research objectives and questions in Chapter 1. To recap, the specific research objectives of this study were:

- To identify the drivers of financial market development in selected African countries;
- To assess the causality between financial market development and institutional quality in selected African countries; and
- To examine the effects of financial market development and institutional quality on economic growth in selected African countries.

4.2 Empirical results and data analysis

4.2.1 Data

The researcher included ten African countries and focused on the period between 2009 and 2017. The choice of the selected African countries was determined by the availability of data, which gave the possibility of obtaining meaningful results. The World Development Indicators (WDI) database was our main source of data for financial market development indicators, while the World Governance Indicators (WGI) and the Kaufmann, Kraay and Mastruzzi (KKM) databases provided access to institutional quality variables' data.

4.2.2 Descriptive statistics for the annual panel data

Table 4.1 below presents the descriptive statistics for the dependent and independent variables. The intention of this stage is to depict the general distribution of data, to detect unusual patterns of observations that can result to problems for further analysis to be conducted. In Table 4.1 below, overall mean, standard deviation, minimum, maximum and number of observations are reported.

Table 4.1: Descriptive statistics for variables used in the pooled estimation

Variable	***Obs***	***Mean***	***St. Dev***	***Min***	***Max***
Voice and accountability	90	(0,08)	0,71	(1,25)	0,94
Political stability	90	(0,53)	0,95	(2,21)	1,10
Government effectiveness	90	(0,13)	0,61	(1,21)	1,06
Regulatory quality	90	(0,07)	0,56	(0,94)	1,13
Rule of law	90	(0,16)	0,64	(1,18)	0,97
Control of corruption	90	(0,26)	0,67	(1,27)	1,03
Capital openness	90	(0,23)	1,39	(1,92)	2,35
Stock market capitalisation	63	2,55	2,87	38,28	91, 20
Liquid liabilities	90	54,04	36,82	0,12	119,35
Stock market value traded	81	14,67	26,71	0,10	135,80
Domestic credit to private sector	90	41,50	31,49	0,19	106,31
Inflation	90	6,33	7,40	(7,65)	52,99
GDP growth	90	4,07	2,82	(4,16)	14,05
Real interest rate	63	5,57	4,57	(6,26)	18,18
Lending rate	72	10,11	4,88	1,44	19,72
Infrastructural development	81	7,69	8,78	0,07	32,67

Source: author's own computations

As shown in the above results, the standard deviation values of liquid liabilities of the financial system (broad money) is the highest with 36.8 %, while institutional quality shared the lowest values between 0.95 and 0.33. This indicates that there is high variation in the value of variables that impact the development of financial market development in the selected countries of study. The minimum values of the institutional quality variables range from the highest value of 0 to the lowest value of -0.94, while the maximum values range from the highest value of 2.35 to the lowest value of 0.94, respectively. This implies that there is an issue of poor institutional quality in the selected countries under study.

The descriptive statistics show that the average values of inflation and interest rate are 6.33 % and 5.57% per annum, which is relatively low and stable. Liquidity liabilities of financial systems (measured by broad money) have an average value of 54%, while domestic credit to private sector have average value of 42%. The average results imply that banking sector of the sampled countries under study fairly distribute savings in the financial system. Stock market value traded and stock market capitalisation, which determines liquidity and the size of the stock market, shows an average value of 15% and 2.6%. This suggests that the sizes of the stock markets are relatively small and less liquid in most of our selected countries. The descriptive statistics show that banking sectors are more developed as compared to stock markets of the sampled countries under study. Our findings corroborate those of Agbloyor, Abor, Adjasi and Yawson (2014) who similarly concluded that African countries' banking sectors were generally more developed than the stock markets.

The capital openness is determined by using the capital account openness index (KAOPEN), developed by Chinn and Ito (2008). The KAOPEN index is the first principal component of four restrictions on cross border transactions which indicate the existence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions and the requirements involving the surrender of exports' proceeds. We ranked the index to values between zero and one. A higher index value shows greater financial openness. The descriptive statistic results for KAOPEN indicate an average of -0.23%, a minimum of -1.92% and a maximum of 2.35%, thereby indicating a lower level of financial openness in our selected countries of study. The mean value of infrastructure is 7.69%, while 0.07% and 32.69% represent its minimum and maximum values, respectively. These values confirm that the level of infrastructural development in these countries remains largely low, as was similarly concluded by Makoni (2016).

4.2.3 Correlation Analysis

Table 4.2: Correlation matrix

	VA	PS	GE	RQ	RL	CC	Instdex	KAOPEN	MC	BM	SVT	DC	Findex	INFL	GDP	RIR	LR	DI	ER	IFR
VC	1																			
PS	0.5038*	1																		
GE	0.8291*	0.5318*	1																	
RQ	0.8384*	0.4405*	0.9594*	1																
RL	0.8083*	0.5791*	0.9573*	0.9191*	1															
CC	0.7565*	0.7462*	0.8724*	0.8298*	0.9330*	1														
Instdex	0.8083*	0.5791*	0.9573*	0.9191*	1.0000*	0.9330*	1													
KAOPEN	0,2031	0,0179	0.3731*	0.4688*	0.3842*	0.3501*	0.3842*	1												
MC	-0,181	-0.5504*	-0,0148	0,0113	-0,0824	-0,2467	-0,0824	0,0464	1											
BM (% of GDP)	-0.2134*	-0,1468	0.2675*	0.2229*	0.2312*	0,1644	0.2312*	0.2260*	0.2862*	1										
SVT (% of GDP)	0.4896*	0.2687*	0.3403*	0.3010*	0.2613*	0.2565*	0.2613*	-0.3480*	-0.3763*	0,0047	1									
DC	-0.2917*	-0,012	0,107	0,0529	0,1114	0,1344	0,1114	0,1208	-0,0906	0.8943*	0,1148	1								
Findex	-0.3544*	-0,0684	0,2156	0,1008	0,1478	0,0947	0,1478	0,1606	0.2862*	1.0000*	-0,1048	0.8653*	1							
INFL	-0,02	-0,0832	0,0241	0,026	-0,0683	-0,1355	-0,0683	0,1393	0,0632	-0,1464	-0,0781	-0.2691*	-0,0272	1						
GDP	-0.2852*	-0,1029	-0.2681*	-0.2208*	-0.2834*	-0.2676*	-0.2834*	0,041	0,19	-0,1509	-0.3272*	-0.2266*	-0,0178	0,1298	1					
IR	-0.4250*	-0,2164	-0.6067*	-0.5940*	-0.5718*	-0.5279*	-0.5718*	-0.3923*	-0,1681	-0.4375*	-0,0922	-0,2224	-0.4457*	-0.6558*	0,2336	1				
LD	-0,0491	-0.5856*	-0.2469*	-0,1511	-0.3608*	-0.4018*	-0.3608*	0.4100*	0.2556*	-0.2433*	-0,1978	-0.3608*	-0,1679	0.3247*	0,1912	0,0189	1			
DR	-0.4235*	-0.4610*	-0.4237*	-0.3928*	-0.4820*	-0.5928*	-0.4820*	-0,1858	0,2419	-0,184	-0,1535	-0.2609*	-0.3789*	0.4678*	0,0601	0.3599*	0.2597*	1		
ER	0,1493	0.2352*	-0,0562	-0,1342	-0,009	0,0836	-0,009	-0.2096*	0.2568*	-0.4018*	-0.2582*	-0.3770*	-0.3671*	-0.2760*	0,0467	0.3309*	0.6972*	-0.4692*	1	
INRF	-0.2485*	-0,0756	0,059	0,0268	0,1782	0,1487	0,1782	0,1191	-0.3466*	0.6887*	0,0462	0.7610*	0.5968*	-0.2659*	-0,2067	-0,033	-0.4849*	-0.2338*	-0.2662*	1
*Significant at 5%																				

Where: VA is voice and accountability, PS is political stability, GE is government effectiveness, RQ is regulatory quality, RL is rule of law, CC is control of corruption, MC is stock market capitalisation, LL is liquid liabilities, SVT is stock market value traded, DC is domestic credit to the private sector, INF is inflation, RIR is real interest rate, LR is lending rate, DIR is deposit interest rate, ER is exchange rate and TEL is the infrastructure proxy**.**

Table 4.2 above summarises the correlation coefficient matrix in which all figures are spread in an orderly fashion on both sides of the diagonal of the table. The correlation matrix enables us to determine the extent of relationships between variables under study. In correlation analysis, a perfect positive relationship that exists between variables is represented by a correlation coefficient equal to +1. A perfect negative relationship that exist between variables is represented by a correlation coefficient equal to -1. The generally accepted p-value to prove the existence of correlation between variables is 0.7 (70%) and below (Mukaka, 2012). Any correlation coefficient above 0.7 implies that the regression coefficients are not uniquely determined and have influences on others.

Our results show that all individual institutional quality variables exhibit significantly positive correlations with each other. Most institutional quality variables are high correlated with coefficients whose magnitude ranges between 0.75 and 1.0. Stock market value traded is positively correlated with all individual institutional quality variables, implying that institutional quality is an essential component of improving the stock markets. There is a positive and significant relationship between capital openness and other institutional quality indicators, except voice and accountability and political stability. It implies that capital openness increases when there is an improvement in government effectiveness, regulatory quality, rule of law and control of corruption.

GDP growth indicates a negative and significant correlation with stock value traded, domestic credit to the private sector, and other institutional quality variables, except political stability. Chong and Calderon's (2000) results show that institutional structure is not effective as it is in developed countries and that institutions have negative impact on

economic growth. Yaprakli (2008) also found a negative relationship between components of institutional quality and economic growth.

Inflation is found to have a negative and significant correlation with domestic credit to private sector. The prior study of Rousseau and Wachtel (2002) provides similar evidence that high inflation impedes banks to provide funds on long term basis and they lack the ability to increase allocation of resources. On the other hand, inflation has been found to have an insignificant relationship with other financial market development indicators. Among the financial development indicators, only liquid liability is significantly and negatively correlated with real interest rate. Lending rate is positively and significantly correlated with stock market capitalisation, and at the same time found to be positively and significantly correlated to liquid liability and domestic credit to the private sector.

Exchange rate is positively and significantly correlated with stock market capitalisation. These results resonate with Apte (2001) who found a positive and significant relationship between exchange rate and stock market capitalisation. On the contrary, exchange rate was found to be negatively and significantly correlated with domestic credit to the private sector, liquid liabilities and stock value traded.

Infrastructural development is found to have positive and significant correlation with the banking sector indicators. Dewan and Ramaprasad (2014) assert that infrastructure contributes to cost reduction which leads expansion business activities in the banking sector. Zagorchev, Vasconcellos and Bae (2011) found that development measures in the telecommunication contribute positively to banking sector and development and economic growth.

The correlation results also show the relationship between the FMD composite index and the variables used for the study. The composite index of financial market development was found to have a negative and significant correlation with real interest rate. These results imply that the improvements in financial market development and institutional quality are realised when there is a decrease in real interest rates. Financial market

development index appears to have negative and insignificant correlation with GDP growth Thus, economic growth has no effects on financial market development and institutional quality. Infrastructure is positively and significantly correlated with financial market development index. The correlation between financial market development and individual institutional variables, together with the institutional quality index, was found to be positive and insignificant.

4.2.4 Principal components analysis

For the purposes of testing robustness of the results obtained, we adopted a similar approach as was used by Makoni (2016) and applied the principal component analysis (PCA) to develop a single composite index of financial market development, as well as the institutional quality for our selected countries of study. The primary objective of PCA is to determine the unit-length linear combination of variables with the highest variance. According to Jolliffe (2005), PCA is a method that enables us to capture linear transformation of a group correlated variables up until we attain an optimal condition, which is the attainment of uncorrelated transformed variables. The transformed variables are called principal components.

The principal component analysis is applied to develop indices summarising information on different measures of financial market development namely domestic credit to private sector, stock market capitalisation, stock value traded broad money. Earlier studies of Makoni (2016) also employed the same variables in constructing a single index of financial market development which measures the overall development in the financial markets. We further constructed an institutional quality index with six individual variables which are voice and accountability, political instability, government effectiveness, regulatory quality, control of corruption and rule of law. The studies of Asongu and Nwachukwu (2016) also used the above-mentioned institutional variables to construct a single institutional quality index on determinants of growth in fast developing countries.

4.2.4.1 Financial market development index

Table 4.3 below presents the eigenvalues of the correlation matrix of the four individual variables that compose the financial market development index. The aggregate number of eigenvalues corresponds with the number of individual variables.

Table 4.3: Principal component analysis: Eigen values

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.90936	.526897	0.4773	0.4773
Comp2	1.38246	.732111	0.3456	0.8230
Comp3	.650352	.592525	0.1626	0.9855
Comp4	.057827	0.00	0.0145	1.000

Source: author's own computations

The results in Table 4.3 above show that the first proxy of financial market development explains a difference of 48% with the eigenvalue of 1.9. The second principal component explains the maximum difference of 34%, with a variance of 1.4. The third principal component explains 16%, while the fourth accounts for only 1% of the variance. Therefore, the more the percentage each component holds, the higher its importance in measuring financial market development. As such, the first two principal components are more relevant measures of FMD as they explain over 82% of the variance.

Table 4.4: Principal component analysis: Eigen vectors (loadings)

Variable	Comp1	Comp2	Comp3	Comp4	Unexpected
Stock market capitalisation	0.2270	-0.6744	0.6421	0.2852	0
Liquidity liabilities	0.7075	0.0667	0.1273	-0.692	0
Stock value traded	-0.1666	0.6561	0.7355	0.0282	0
Domestic credit to private sector	0.6482	0.3320	-0.1748	0.6626	0

Source: author's own computations

Table 4.4 above presents the coefficient value of each component which reflect their level of importance as a measurement of financial market development. In principal component 1, liquidity liabilities have the largest positive coefficient which shows its strongest impact in determining financial market development. Stock market value traded makes the highest contribution in both principal component 2 and 3. In principal component 4, domestic credit to the private sector shows the largest positive weight. Stock market capitalisation is not in a visible position due to limited channelling of funds raised in the selected countries stock markets. The financial market development measurement was a combination of bank credit and stock market development indicators, all of which contribute significantly in defining financial market development.

This study used PCA to determine an appropriate composite index for financial market development in our sampled African countries using the following specific PCA equation:

$$\boldsymbol{FMD\_INDEX = 0.2270 * MC + 0.7075 * LL + 0.1666 * SVT + 0.6482 * DC} \quad \textit{(4.1)}$$

Where:

FMD_INDEX= the first principal component for financial market development

MC = Stock Market capitalisation as a percentage of GDP

LL = Liquid liabilities of financial systems (M3 to GDP)

SVT= stock market value traded as a percentage of GDP

DC = domestic credit by banks to private sector divided by GDP

4.2.4.2 Institutional quality development index

Table 4.5 indicates the eigenvalues of the correlation matrix of the individual six indicators that compose institutional quality in the selected countries of this study. The six individual variables included in the institutional quality composite index were voice and

accountability (VC), regulatory quality (RQ), government effectiveness (GE), control of corruption (CC), rule of law (RL) and political stability (PS).

***Table 4.5*: Principal component analysis: Eigen values**

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.89005	4.1876	0.8150	0.8150
Comp2	.702443	.448708	0.1171	0.9321
Comp3	.253744	.162869	0.0423	0.9744
Comp4	.0908652	.0468786	0.0151	0.9895
Comp5	.0439866	.250634	0.0073	0.9968
Comp6	189232	0.00	0.0032	1.0000

Source: author's own computations

The eigenvalues in table 4.5 above indicate that the first principal component explains maximum variance 82% of the standardised variance with eigenvalue of 4.9. The second principal component explains 12%, with eigenvalue of 0.70. The third principal component explains 4.2% of the variance, whereas the fourth, fifth and sixth principal components comprise of the outstanding 2% of the variance. Thus, the first principal component explains institutional quality better than any other principal components in the selected countries under study.

Table 4.6: Principal component analysis: Eigen values

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
VA	0.3987	-0,1972	0.8674	-0,2151	-0,0522	-0,0288
PS	0.3070	0,8626	0.1429	0,3468	-0,0443	0,1382
GE	0.4358	-0,2098	0.1968	0,3978	-0,4569	-0,6002
RL	0.4236	-0,3398	-0,1079	0,4713	0,6144	0,3064
CC	0.4390	-0,101	-0,311	-0,3138	-0,4774	0,6115
RQ	0.4292	-0,2177	-0,2831	-0,5955	0,4256	-0,3899

Source: author's own computations

In table 4.6 above, principal component 1 shows a positive coefficient, which indicates the overall measure for institutional quality. In principal component 1, government effectiveness, rule of law, control of corruption and regulatory quality almost have the same weight which shows their level of influence in these components. The maximum weight in principal component 2 is for political stability, implying that there is a strong effect of this variable in these components. The maximum weight in principal component 3 is the voice and accountability. Rule of law has the strongest influence in both principal component 4 and 5, while control of corruption shows the largest positive weight in principal component 6.

This study used PCA to establish an appropriate composite institutional quality index in selected African economies using the following specific equation:

$$INSTQ\_INDEX = 0.3987 * VOICE\_AND\_ACCOUNTABILTY + 0.3070 * POLITICAL\_INSTABILITY + 0.4358 * GOVERNMENT\_EFFECTIVENESS + 0.4236 * RULE\_OF\_LAW + 0.4390 * CONTROL\_OF\_CORRUPTION + 0.4292 * REGULATORY\_QUALITY$$

(4.2)

Where:

INSTQ_INDEX= the first principal component for institutional quality development based on the six-individual variable for voice and accountability, political stability, government effectiveness, rule of law, control of corruption and regulatory quality.

4.2.5 Determinants of financial market development

The dynamic GMM model regression results on the determinants of financial market development using the financial development index are shown in table 4.7 below**.**

Table 4.7: Determinants of financial market development (Findex)

	Pooled effects	Fixed effects	Random Effects	System GMM	GLS
L.findex	1.090***	0.905**	1.090***	0.620***	1.041***
	(0.0589)	(0.156)	(0.0465)	(0.179)	(0.0352)
instdex	0.0787	0.186	0.0787	0.360***	0.0615***
	(0.0445)	(0.100)	(0.0510)	(0.0743)	(0.0183)
inf	-0.0239*	-0.0252*	-0.0239	-0.0281***	-0.0228***
	(0.00908)	(0.00790)	(0.0130)	(0.00751)	(0.00387)
gdp	-0.00726	-0.00634	-0.00726	-0.0196***	-0.0121**
	(0.00537)	(0.00447)	(0.00527)	(0.00396)	(0.00423)
lr	0.0254	0.0181	0.0254	0.0206	0.0161*
	(0.0148)	(0.0221)	(0.0148)	(0.0185)	(0.00662)
tel	0.000554	-0.0144	0.000554	0.0175*	0.00163
	(0.00148)	(0.00870)	(0.000913)	(0.00721)	(0.00104)
_cons	-0.149	0.189	-0.149		-0.0533
	(0.116)	(0.189)	(0.0932)		(0.0638)
N	48	48	48	42	48
R^2	0.990	0.736			

Source: author's own computations

Table 4.7 above provides the GMM regression results of the empirical estimation for the determinants of financial market development. The GMM estimator in system enables taking into consideration of the problem of endogeniety of variables and is based on minimal assumptions. The results from the table 4.7 above show that the composite index of financial development has a positive and highly significant relationship with financial market development.

Institutional quality was found to have a positive and highly significant effect on FMD in countries under study. This implies that the development changes in institutional quality cause development in financial markets. Our institutional index comprises of political stability, governance effectiveness, control of corruption, regulatory quality, voice and accountability, and rule of law. The positive impact of institutional quality on financial

market development is supported by North (1990), who theoretically examined the nature of institutions and their effects on the development of financial markets. Khan, Kong, Xiang and Zhang (2019) investigated the impact of institutional quality on the financial market development of 15 emerging economies and found that institutional quality positively and significantly influences financial market development.

Favourable political environment boost investors' confidence due to the low risk in the financial market of the country and this encourages to FMD. In addition, political stability improves profits in the banking sector. The importance of political stability on FMD is supported by Eita (2015), who confirmed that political instability hinders FMD, and thus political stability is a key factor of variation in FMD around the world.

Ahlin and Pang (2008) asserted that corruption improves liquidity and therefore results in FMD. The studies of Ayaydin and Baltaci, (2011) confirmed that corruption has a negative effect on financial market development as it reduces competition in the financial markets. In contrast, Aljazaerli, Sirop and Mouselli (2016) argued that corruption is a catalyst to financial market development. Our findings are supported by Missaoui, Brahmi and BenRajeb (2018), who concluded a positive and significant effect of level corruption on stock market development.

Rule of law and quality regulation, as elements in the institutional quality index, have been found to have to have a positive effect on FMD in this study. The findings are backed by the studies of La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000) and Agyemang *et al*. (2018) who argued that countries with well-developed regulations can safeguard small scale savers and investors, which ultimately support FMD.

The results for inflation in the study sample of selected countries have been found to have a negative and highly significant effect on FMD. Thus, higher inflation rates may result to limitations and uncertainties in the financial markets. Our results are consistent with the theoretical studies of Boyd, Levine and Smith (2001), who found that there is negative relationship between inflation and financial market development. Boyd *et al*. (2001) affirmed that higher rates of inflation reduce liquidity, which subsequently affects the size

of financial markets. In addition, we found that there is positive and insignificant relationship between lending rates and FMD.

Real GDP growth reflected a negative and significant impact on FMD towards the countries under study. The results imply that economic development has a negative impact on financial market development. The negative relationship between real GDP and financial market development is supported by Samargandi, Fidrmuc and Ghosh (2015), who used a threshold effect model found a negative relationship between FMD and economic growth in 52 middle income countries over the period of 1980-2008. Arcand, Berkes and Panizza (2015) further assert that financial development negatively affects GDP when credit to the private sector strikes a threshold level.

Infrastructural development was measured as the number of fixed telephone lines per 1000 people of population. It was found to have a positive but weak impact on FMD in the sampled countries under study. Development changes in infrastructure cause FMD. Telecommunication infrastructural development is an important factor in FMD because it facilitates the sharing of real-time information relevant for FMD and other transactions to be performed efficiently. These results correspond with those of Hossein, Fatemeh and Seyed (2013) who studied the impact of infrastructure on financial market development in the world leading markets and found that a direct and significant relationship between infrastructure and FMD.

4.2.6. Unit root test results

Before we investigated the long run relationships between financial market development, institutional quality and other sets of macroeconomic determinants, the stationarity properties of variables were examined. In a broad sense, Gujarati, Porter and Gunasekar (2012) pointed out that a data series is stationary when mean and variance remain at fixed level for a certain period. The panel data for the two main variables, namely financial market development and institutional quality (both individual and their composite index) were examined for their stationarity properties by using three unit root tests: Levin, Lin and Chu (LLC), Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP).

Table 4.8: Stationary tests of variables using LLC, ADF and PPP unit roots

Variable	Intercept	Intercept and Trend	No trend	Diagnosis
Stationary tests of variables using – Levin, Lin & Chu t* test				
CC	-6.65382***	-7.82871***	-8.01083***	I(1)
DC	-4.44137***	-6.97110***	-7.66546***	I(1)
DIR	-12.2224***	-10.0986***	-9.02822***	I(1)
EXC	-2.09527**	-3.85488***	-4.27598***	I(1)
GDP	-1.84647**	-4.61633***	-3.23681***	I(0)
GE	-3.90241***	-9.04311***	-5.75801***	I(1)
INF	-4.55075***	-7.17378***	-1.51827*	I(0)
KO	-3.10882***	-0.83793	-0.50544	I(0)
KO1	-3.10881***	-0.83793	-0.50472	I(0)
LR	-6.59398***	-7.33167***	-5.64201***	I(1)
MC	-6.58110***	-18.5423***	-5.99945***	I(1)
MONEY	-7.95411***	-15.1738***	-7.06562***	I(1)
PS	-6.14655***	-7.24992***	-8.31145***	I(1)
RIR	-6.94343***	-7.57946***	-4.37782***	I(1)
RL	-10.7744***	-26.0721***	-6.80669***	I(1)
RQ	-3.69211***	-3.84745***	-3.65560***	I(1)
ST	-3.57032***	-5.36316***	-8.70480***	I(0)
TEL	-5.90680***	-7.05568***	-4.99940***	I(1)
VA	-3.99746***	-6.72408***	-5.69518***	I(1)
Stationary tests of variables using – Augmented Dickey Fuller (ADF) test				
CC	41.7765***	28.7039*	69.8989***	I(1)
DC	32.0116***	19.9111**	67.2050***	I(1)
DIR	40.5618***	22.0082**	57.3604***	I(1)
EXC	23.9470	17.7987	42.1246***	I(1)
GDP	29.7283*	31.6378**	34.5727**	I(0)
GE	27.6206	22.0696	56.6165***	I(1)
INF	34.7988	28.4101*	17.7911	I(0)
KO	7.75051*	0.83285	8.34148	I(0)
KO1	7.75051*	0.83285	11.3110*	I(0)
LR	24.7186*	27.1053**	42.3181***	I(1)
MC	28.8417***	40.3180***	43.2878***	I(1)
MONEY	39.2112***	46.7110***	64.4620***	I(1)
PS	40.9487***	31.6955**	82.1118***	I(1)
RIR	32.7782***	27.8993***	51.6072***	I(1)
RL	36.2867***	30.2201*	53.1814***	I(1)
RQ	19.9197**	19.9164**	31.7438**	I(1)
ST	28.6203**	24.7202***	83.5653***	I(0)

TEL	26.6126*	20.0001	42.5636***	I(1)
VA	23.1604	20.8076	50.1590***	I(1)
Stationary tests of variables using Phillips-Perron (PP) test				
CC	70.7146***	59.1831***	100.018***	I(1)
DC	75.1992***	49.0870***	107.046***	I(1)
DIR	45.8174***	22.2891	65.1311***	I(1)
EXC	42.8035***	29.8139*	53.6942***	I(1)
GDP	46.8968***	64.0643***	28.1630	I(0)
GE	70.9218***	58.1201***	97.7703***	I(1)
INF	63.4603***	67.8625***	36.1398***	I(0)
KO	9.51107**	0.38461	15.5924**	I(0)
KO1	7.98294***	0.38461	13.0818**	I(0)
LR	30.6003**	45.8621***	57.1655***	I(1)
MC	25.5820**	38.4123***	47.9395***	I(1)
MONEY	69.8102***	74.2906***	96.9966***	I(1)
PS	67.5157***	64.8330***	106.751***	I(1)
RIR	64.5541***	56.7945***	97.9511***	I(1)
RL	63.9066***	92.1647***	94.9116***	I(1)
RQ	9.24759*	89.1654***	77.9917***	I(1)
ST	55.2533***	60.7322***	117.550***	I(0)
TEL	49.7552***	52.8269***	72.1914***	I(1)
VA	41.0128***	44.8990***	83.0503***	I(1)

Source: Author's own computations

***; **; * indicates that we reject the null hypothesis of unit root tests at 0.1, 1% and 5%, respectively

Table 4.8 above indicates the unit root test determined by employing the LLC, ADF and PP techniques. The unit root results table is composed of four columns. The first column shows the unit root result in individual effect (intercept only), while the second column capture unit root test results in individual effect (intercept) and the third column indicate the unit root results with no influence (intercept and trend). The last column provides an overview of order of integration regarding the unit root results for each technique. The unit root test is performed with the null hypothesis of non-stationary (unit root) for each data series and our results indicated a mixed order of integration of variables. Among all variables, stock value traded, capital openness, inflation and GDP growth were stationary at the level I(0) as shown in Table 4.8 above. The other remaining variables were

stationary at first difference I(1), and none of the variables were found to be integrated at the second difference I(2).

4.2.6.1 Optimal lag length criteria

After determining the order of integration, we then established the optimal order of lags on first differenced variables. We obtained the lagged level of variables using Akaike Information Criterion (AIC), Schwaz Bayesian Criterion (SC) and Hannan-Quinn Criterion (HQ). These methods are undoubtedly superior to others, especially in a small sample. Liew (2004) concluded that AIC, FEP and HQ achieved better results as compared to other methods used in small sample study.

Table 4.9: Optimal Lag Lengths

			FINDEX INSTDEX LR			
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-243.4491	NA	262.2292	14.08280	14.21612	14.12882
1	-13.58372	407.1900	0.000869	1.461927	1.995189*	1.646009*
2	-2.611681	17.55527*	0.000786*	1.349239*	2.282448	1.671382
3	4.288560	9.857486	0.000916	1.469225	2.802381	1.929430
4	12.57558	10.41797	0.001016	1.509967	3.243069	2.108233
			FINDEX INSTDEX GDP			
0	-222.4856	NA	79.14705	12.88489	13.01821	12.93091
1	-52.87876	300.4464*	0.008203*	3.707358*	4.240620*	3.891440*
2	-47.21586	9.060643	0.010060	3.898049	4.831258	4.220192
3	-43.76999	4.922670	0.014277	4.215428	5.548583	4.675633
4	-39.27649	5.648970	0.019668	4.472942	6.206044	5.071209
			FINDEX INSTDEX INF			
0	-232.3777	NA	139.2917	13.45016	13.58347	13.49618
1	-64.45185	297.4687*	0.015892*	4.368677*	4.901939*	4.552759*
2	-58.63179	9.312098	0.019315	4.550388	5.483597	4.872532
3	-51.08742	10.77767	0.021688	4.633567	5.966722	5.093772
4	-47.61906	4.360219	0.031680	4.949661	6.682763	5.547927

Source: Author's own computations. Maximum lags as indicated

The summary of optimal lag length results is presented in table 4.9 above. Based on the results, it can be observed that the optimal lag length for the combination of findex,

instindex and lending rate is lag 2, whereas findex, instindex and GDP growth optimal lag length is lag 1. Findex, instindex and inflation have an optimal lag length of 2. The next step was to determine the long run equilibrium among our variables.

4.2.7 Cointegration and Vector Error Correction

In order to determine the cointegration relationship between financial market development, institutional quality and economic growth, we employed the ARDL approach. Pesaran *et al*. (2001) argued that the flexibility of the ARDL approach accommodates a group of variables that are integrated in a different order. Furthermore, a dynamic error correlation model can be extracted from the ARDL by means of linear transformation (Banerjee, Dolado and Mestre, 1998).

4.2.8 Pooled Mean Group (PMG) and Mean Group (MG)

For the purposes of determining the long/ short run dynamics and cointergration relationships of the variables of interest, we employed a technique that is appropriate for dynamic panel data. To better illustrate this point, we use the pooled mean group (PMG) model introduced by Pesaran *et al*. (1999) and the mean group (MG) model introduced by Pesaran and Smith (1995) as our estimator for the ARDL panel. The pooled mean group assumes that short run coefficients, particularly with regard to the intercept, the speed of adjustment to the log run equilibrium values, and error variance are homogeneous from country to country; although the long run slope coefficients are limited to be homogeneous in each country (Pesaran and Smith,1995). The mean group demand for estimations of individual regression for each country and computing the coefficients as unweighted means of the estimated coefficient for a single country (Pesaran and Smith, 1995). However, no restrictions are involved on this model and it enables for all coefficients to differ and be heterogeneous in both the long run and short run (Pesaran and Smith, 1995).

The Hausman test is conducted to decide on whether to use pooled mean group (PMG) or mean group (MG). The null hypothesis implies slope homogeneity of the panel. Given that the homogeneity of slope is confirmed, we use the PMG estimator and the null hypothesis cannot be rejected. If the probability value is more than 5%, we consider the

PMG estimator to analyse the panel data. On the other hand, MG is considered when the probability value is less than 5%.

4.2.8.1 Cointegration / Long run relationships

This section presents and discusses the results obtained from the Pooled Mean Group (PMG) and Mean Group (MG) estimators. Table 4.10 below provides an overview of the pooled mean group and mean group estimates of cointegration and causal relationship between financial market development, institutional quality, infrastructure, inflation, interest rate and lending rates for our selected developing African countries in this study.

Table 4.10: Cointegrating relationship between FMD, institutional quality and infrastructure

	PMG D.Findex	MG D.Findex
Long-run		
Instdex	1.538***	-04.79
	(-12.82)	(-1.51)
Infdev	0.0172**	-0.0137
	(2.70)	(-0.24)
Short run		
ECT	-0.324*	-0.947**
	(-1.04)	(-2.80)
Instdex	-0.0336	-0.0292
	(-0.22)	(-0.19)
Infdev	0.0657	0.0560
	(-0.61)	(-1.52)
_cons	0.717	0.956
	(0.82)	(0.98)
N	48	48

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: author's own computations

Table 4.11: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	4.47
Prob>chi2	0.1072

Source: Author's own computations

The Hausman test was carried out in order to select the most suitable model for ARDL. The results in table 4.11 above indicate that the Hausman test probability is more than 5%, therefore the discussion of the outcomes is based on the pooled mean group estimator to determine the cointegrating relationships between financial market development and institutional quality in the presence of infrastructure. As indicated in table 4.10, the ECT coefficient is negative and significant showing a cointegrating relationship between financial sector development, institutional development and infrastructure development as measured by telephone lines. This confirms a long run relationship amongst the variables under analysis. In times of a shock or impulse, the model restores to its equilibrium at a rate of 32.4% times within a year. This implies that institutional quality and infrastructure are important determinants of financial market development. Comparable results were found in the past studies of Cherif and Dreger (2016) and Kaufmann and Kraay (2003).

Table 4.12: Cointegration between financial market development, institutional quality and infrastructure development

	(1) D.instdex	(2) D.instdex
Long-run		
findex	0.938***	-1.593*
	(4.45)	(-2.11)
infdev	-0.00695	0.00750
	(-0.39)	(0.05)
Short run		
ECT	-0.353*	-0.392
	(-2.39)	(-1.19)
D.findex	0.0293	-0.233
	(0.06)	(-0.20)
D.infdev	0.0837	0.0586
	(0.65)	(0.77)
_cons	-0.0897	1.505
	(-0.35)	(1.95)
N	48	48

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.13: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.00
Prob>chi2	0.9999

Source: Author's own computations

Table 4.12 above summarises the pooled mean group and mean group on the cointegration and causality relationship between financial market development,

institutional quality and infrastructure. The p- value associated with the Hausman test is greater than 5% and we thus fail to reject the null hypothesis; therefore, the pooled mean group is the most appropriate model. The long run relationship between institutional quality, infrastructural development and financial market development established as the coefficient of the ECT is negative at the 1% level of significance.

Table 4.14: Cointegrating relationship between financial market development, institutional development and infrastructure development

	PMG D.infdev	MG D.infdev
Long run		
findex	13.16***	-2.727
	(8.15)	(-0.26)
instdex	4.141***	0.709
	(4.39)	(0.42)
Short run		
ECT	-0.427	-0.629**
	(-1.91)	(-2.74)
D.findex	-5.790	-1.868
	(-1.08)	(-0.37)
D.instdex	-3.038	-2.799
	(-1.68)	(-1.80)
_cons	3.450	8.763
	(1.31)	(1.57)
N	48	48

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.15: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	6.72
Prob>chi2	0.346

Source: Author's own computations

Table 4.14 above presents the summary of the pool mean group and mean group of the cointegrating relationship between financial market development, institutional quality and infrastructure development. Based on these results, the probability of the Chi^2 statistic is less than 5 % and hence we reject the null hypothesis. However, the mean group happens to be the most suitable model to apply. It was found that the relationship between financial market development, institutional quality and infrastructure development is negative and significant at 1% level.

Table 4.16: Cointegrating relationship between financial market development, institutional quality and inflation

	(1) D.findex	(2) D.findex
Long run		
instdex	1.482	0.776
	(1.14)	(1.33)
inf	-0.0983	0.0376
	(-0.75)	(0.50)
Short run		
ECT	-0.0811*	-0.729
	(-2.52)	(-1.82)
D.instdex	-0.347	-0.0507
	(-1.91)	(-0.32)
D.inf	-0.00144	-0.00906**
	(-0.26)	(-2.76)
_cons	0.0323	-0.0317
	(0.56)	(-0.03)
N	56	56

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.17: Hausman test results: choice between MG &PMG

chi2(2)	**(b-B)'[(V_b-V_B)^(-1)](b-B)**
	0.00
Prob>chi2	**0.9999**

Source: Author's own computations

A summary of results on cointegration relationships between financial market development, institutional quality and inflation are presented in table 4.16 above. To determine the appropriate estimator, we considered the p-value associated with Hausman test for PMG and MG. Considering the results above, the probability of chi-

square (chi^2) statistic was greater than 5%, we failed to reject the null hypothesis, therefore the pooled mean group was adopted. Based on PMG, we found that the long run coefficient of financial market development, institutional quality and inflation is negative and significant at 5% level. In times of a shock or impulse, the model restores to its equilibrium at a rate of 8.11% times within a year. This finding is in line with McKinnon's (1991) theory which stated that the steadiness of prices is essential for financial intermediation, thus high inflation rates discourage long term investment, compounding of information asymmetry, and that inflation hinders financial market development.

Table 4.18: Cointegrating relationship between financial market development, institutional quality and inflation

	(1) D.instdex	(2) D.instdex
Long-run		
findex	-0.695***	-4.594
	(-5.61)	(-0.65)
inf	0.00269	-0.0260
	(0.49)	(-0.97)
Short run		
ECT	-0.244	-0.387
	(-1.05)	(-0.81)
D.findex	0.427	5.056
	(0.66)	(0.97)
D.inf	0.0255*	0.0134
	(2.26)	(1.22)
_cons	0.187	-14.19
	(0.59)	(-0.95)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.19: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.00
Prob>chi2	1.0000

Source: Author's own computations

This part discusses the results of our estimation on the cointegrating relationship between financial market development, institutional quality and inflation. In reference to Table 4.19, the PMG is the preferred estimation model considering that the p- value of the Hausman test is greater than 5%. However, the discussion of the results will be mainly from the output of the PMG estimator. The long run relationship between financial market development, institutional quality and inflation is negative and insignificant. This clearly shows that there is no cointegration between financial market development, institutional quality and inflation.

Table 4.20: Summary of cointegrating relationships between financial market development, institutional quality and inflation

	(1) D.inf	(2) D.inf
Long run		
findex	2.987*	-693.5
	(2.12)	(-1.02)
instdex	-0.891	-34.68*
	(-1.01)	(-2.11)
Short run		
ECT	-0.913***	-0.753***
	(-6.01)	(-6.47)
D.findex	19.88	185.5
	(0.55)	(0.93)
D.instdex	0.645	12.43**
	(0.15)	(2.71)
_cons	5.870*	-522.6
	(2.15)	(-0.97)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.21: Hausman test results: choice between MG & PMG

chi2(2)	**(b-B)'[(V_b-V_B)^(-1)](b-B)**
	0.07
Prob>chi2	**0.9658**

Source: Author's own computations

Table 4.20 provides a summary of the Pooled Mean Group and mean group on the cointegrating relationships between financial market development, institutional development and inflation. To determine the existence of cointegration, we adopted the pooled mean group considering that our p-value for Hausman test is greater than 5 %.

The results above show that financial market development, institutional quality and inflation are cointegrated. The ECT coefficient is negative and significant showing a cointegrating relationship. This confirms a long run relationship amongst the variables under study, similar to the findings of Bolgorian (2011) who also earlier concluded the negative and significant long run effect of political stability, control of corruption and inflation on stock market development.

Table 4.22: Cointegrating relationship between financial market development, institutional quality and economic growth

	(1) D.findex	(2) D.findex
Long run		
Instdex	0.0252 (1.07)	1.462 (1.28)
Gdp	0.00406 (1.66)	-0.975 (-1.04)
Short run		
ECT	-0.440 (-1.78)	-0.877* (-2.47)
D.instdex	-0.317 (-1.10)	-0.328 (-1.05)
D.gdp	-0.00555 (-0.74)	0.000126 (0.02)
_cons	-0.134 (-0.47)	-0.382 (-0.33)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.23: Hausman test result: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.14
Prob>chi2	0.9333

Source: Author's own computations

Table 4.22 above provides a summary of the pooled mean group and mean group on the cointegrating relationship between financial market development, institutional quality and GDP. The p-value of our Hausman test is more than 5% therefore the pooled mean group is the most appropriate model. According to the results above, the ECT coefficient between institutional, financial development and economic growth is positive but insignificant. This indicates the non-existence of long run relationships between institutional quality, financial development and economic growth. There is no cointegrating of variables mentioned above.

Table 4.24: Cointegrating relationships between financial market development, instititional quality and economic growth

	(1) D.instdex	(2) D.instdex
Long run		
Findex	0.494***	1.686
	(23.43)	(0.84)
GDP	0.0154***	-0.340
	(16.01)	(-1.12)
Short run		
ECT	-0.321	-0.586**
	(-1.27)	(-2.62)
D.findex	2.143	3.364
	(0.93)	(1.01)
D.gdp	0.00926	0.0245
	(0.73)	(1.43)
_cons	0.186	0.197
	(0.56)	(0.29)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.25: Hausman test results: choice between MG & PMG

chi2(2)	**(b-B)'[(V_b-V_B)^(-1)](b-B)**
	0.95
Prob>chi2	**0.6234**

Source: Author's own computations

Table 4.24 reports the results of the pooled mean group and mean group on the cointegrating relationships between financial market development, institutional quality

and economic growth. Our Hausman test indicates that we cannot reject the null hypothesis, therefore we used the pooled mean results to determine the long run relationship between variables. The results confirmed that there is negative but insignificant relationship between stated variables. We thus concluded that no cointegration relationships exist between the variables under study. Our findings are in line with Boako, Acheampong and Ibrahim (2017) who also found a negative and insignificant result between economic development and financial market development. They further explained this could be attributed to an increase in economic development which decreases bank credit.

Table 4.26: Cointegrating relationships between financial market development, institutional quality and economic growth

	(1) D.gdp	(2) D.gdp
Long run		
findex	0.525	4.888
	(1.25)	(0.52)
instdex	0.987***	7.177
	(3.99)	(0.70)
Short run		
ECT	-0.855***	-1.096***
	(-6.27)	(-6.74)
D.findex	-105.2	-104.3
	(-1.06)	(-1.03)
D.instdex	5.884	-1.310
	(1.00)	(-0.17)
_cons	2.140***	-0.243
	(3.78)	(-0.02)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.27: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.06
Prob>chi2	0.9722

Source: Author's own computations

The cointegrating results between financial market development, institutional quality and economic growth are shown in Table 4.26 above. The p-value of the statistic results is greater than 5%, therefore we fail to reject the null hypothesis implying that the pooled mean is the most appropriate model to adopt. The results indicate that the cointegration coefficient of financial market development, institutional quality and economic growth is positive and significant at 0.1% level. This shows that there is a long run relationship between financial market development, institutional quality and economic growth, confirming the existence of cointegrating relationships thereof. The long run relationship between economic growth and financial market development is supported by the endogenous growth model which states that economic growth positively impacts financial markets by setting up demands for financial instruments; and this subsequently results in financial market development, and at the same time, further economic growth (King and Levine, 1993).

Table 4.28: Cointegrating relationships between financial market development, institutional quality and lending rates

	(1) D.findex	(2) D.findex
Long run		
instdex	-0.0544	0.311
	(-0.54)	(1.14)
lr	-0.0517*	-0.217
	(-2.26)	(-1.23)
Sort run		
ECT	-0.465**	-0.828***
	(-2.86)	(-4.15)
D.instdex	-0.285	-0.352
	(-1.06)	(-1.73)
D.lr	0.00691	0.0511
	(0.18)	(1.40)
_cons	0.365	-0.00793
	(1.86)	(-0.01)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.29: Hausman test results: choice between MG &PMG

chi2(2)	**(b-B)'[(V_b-V_B)^(-1)](b-B)**
	0.64
Prob>chi2	**0.7250**

Source: Author's own computations

Table 4.28 presents a summary of pooled mean group and mean group on the cointegrating relationship between financial market development, institutional quality and lending rates. Based on the results above, the Hausman results indicate that the null

hypothesis cannot be rejected since the p-value is greater than 5 %. Therefore, the pooled mean group is the preferred estimator. The ECT coefficient is negative but significant, showing a cointegrating relationship between financial sector development, institutional development and the lending rate. This confirms a long run relationship amongst the variables under analysis. In times of a shock, the model restores to its equilibrium at a rate of 46.5% times within a year.

Table 4.30: Cointegrating relationship between financial market development, institutional quality and lending rates

	(1) D.instdex	(2) D.instdex
Long run		
findex	-0.824***	-2.606
	(-5.24)	(-1.20)
lr	-0.0514***	0.150
	(-5.71)	(0.72)
Sort run		
ECT	-0.524*	-0.923***
	(-2.43)	(-4.60)
D.findex	0.675	1.098
	(0.93)	(0.74)
D.lr	-0.0408	-0.185
	(-0.70)	(-1.04)
_cons	0.171	-6.814
	(0.47)	(-1.30)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.31: Hausman test results: choice between MG and PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.74
Prob>chi2	0.6896

Source: Author's own computations

Table 4.30 above provides a summary of pooled mean group and mean group results on integrating relationship between financial market development, institutional quality and lending rate. Our discussion is based on pooled mean group results considering that the probability of the Hausman test is greater than 5 %. The long run relationship is proved between financial market development, institutional quality and lending rate since the cointegration coefficient is negative and significant at 5 % level.

Table 4.32: Cointegrating and causality relationships between financial market development, institutional quality and lending rates

	(1) D.lr	(2) D.lr
Long run		
findex	-3.004**	-736.4
	(-3.01)	(-1.00)
instdex	2.522**	-32.01
	(2.75)	(-0.97)
Short run		
ECT	0.0957	-0.108
	(0.32)	(-0.30)
D.findex	7.279	-3.737
	(1.32)	(-0.51)
D.instdex	2.968	4.617
	(0.96)	(1.40)
_cons	-0.906	43.82
	(-0.35)	(1.15)
N	56	56

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.33: Hausman test results: choice between MG & PMG

chi2(2)	(b-B)'[(V_b-V_B)^(-1)](b-B)
	0.31
Prob>chi2	0.8548

Source: Author's own computations

Table 4.32 above reports the results of the pooled mean group and mean group on the cointegration and causality between financial market development, institutional quality and lending rate. The Hausman test results show that the p-value is greater than 5 % therefore we fail to reject the null hypothesis. Basing on Hausman test results, the discussion is drawn from the PMG estimator output. The results indicate that there is no long run relationship between financial market development, institutional quality and landing rate. However, this confirms the non-existence of any cointegrating relationship.

4.2.9: Panel Causality Test

The previous section only considered the results of long run and short run relationship between our variables of interest. This section discusses the causal relationship between our variables namely financial market development, institutional quality, infrastructure, inflation, lending rate and economic growth by employing the tri-variate VECM within the ARDL model. The causality relationship is deduced from groups, in this instance, the long run causality, short run causality and strong causality/ joint causality. Each of the variables are chosen for explaining the causality relationship were taken in turns as a dependent variable in the tri-variate analysis of the relationships. The results that explains the causality links are presented in Table 4.34 below. The causality between variables of interest is defined by the level of significance of the coefficients and the level

of significance of the corresponding error correction terms that indicate the joint causality of the selected variables.

Table 4.34: Causal links among the variables

Dependent variable	**Source of Causation (independent variables)**						
	Long run coefficients			**Short run coefficients**			
	Findex	**Instdex**	**Inf**	**∆Findex**	**∆Instdex**	**Inf**	**ECT**
∆Findex		1.538*** (12.82)	0.0172** (2.70)		-0.0336 (-0.22)	-0.0657 (0.61)	--0.324* (-1.04)
∆Instdex	0.938*** (4.45)		-0.00695 (-0.39)	0.0293 (0.06)		0.0837 (0.65)	-0.353* (-2.39)
∆Inf	-2.727 (-0.26)	0.709 (0.42)		-1.868 (-0.37)	-2.799 (-1.80)		-0.629** (-2.74)
	Findex	**Instdex**	**Inf**	**∆Findex**	**∆Instdex**	**∆Inf**	**ECT**
∆Findex		1.482 (1.14)	-0.0983 (-0.75)		-0.347 (-1.91)	-0.00144 (-0.26)	-0.0811* (-2.52)
∆Instdex	-0.695*** (-5.61)		0.00269 (0.49)	0.427 (0.66)		0.0255* (2.26)	-0.244 (-1.05)
∆Inf	2.987* (2.12)	-0.891 (-1.01)		19.88 (0.55)	0.645 (0.15)		-0.913*** (-6.01)
	Findex	**Instdex**	**Ir**	**∆Findex**	**∆Instdex**	**∆Ir**	**ECT**
∆Findex		-0.0544 (-0.54)	-0.0517* (-2.26)		-0.285 (-1.06)	0.00691 (0.18)	-0.465** (-2.86)
∆Instdex	-0.824*** (-5.24)		-0.0514*** (-5.71)	0.675 (0.93)		-0.0408 (-0.70)	-0.524* (-2.43)
∆Ir	-3.004** (-3.01)	2.522** (2.75)		7.279 (1.32)	2.968 (0.96)		0.0957 (0.32)
	Findex	**Instdex**	**Gdpg**	**∆Findex**	**∆Instdex**	**∆Gdpg**	**ECT**
∆Findex		0.0252 (1.07)	0.00406 (1.66)		-0.317 (-1.10)	-0.00555 (-0.74)	-0.440 (-1.78)
∆Instdex	0.494*** (23.43)		0.0154*** (16.01)	2.143 (0.93)		0.00926 (0.73)	-0.321 (-1.27)
∆Gdpg	0.525 (1.25)	0.987*** (3.99)		-105.2 (-1.06)	5.884 (1.00)		-0.855*** (-6.27)

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's own computations

Table 4.34 above presents results for the causal relationships between variables under study, as determined by using the significance of coefficient. Every single variable chosen for investigating the causal linkage was taken in turn as a dependent variable in the tri-

variate model. Considering the relationship between financial market development, institutional quality and infrastructure, the results shows that there is a bi-directional relationship between financial market development and institutional quality in the long run, and the error correction term is statistically significant at 5 % level. The causal effect of institutional quality on financial development is supported by the theoretical work of North (1990) who argued that good institutional quality support incentive framework that result in increased economic growth by means of reducing uncertainty and improving efficiency.

On the other hand, we concluded that there is uni-directional causality between infrastructural development and financial market development. Infrastructural development granger causes financial market development, but financial market development does not granger cause infrastructural development in the long run. The uni-directional causality between financial market development and infrastructure is supported by Alomari, Marashdeh and Bashayreh (2019), who conducted an empirical study using the Generalised Method of Moment for dynamic panel data on a sample of 21 high income countries for the period of 2009-2017 and found that a rise in mobile phone user positively influences the development of financial markets.

With regard to financial market development and institutional quality in the presence of inflation, we found that there is a uni-directional relationship. FMD granger causes institutional quality, but institutional quality does not granger causes financial market development in the long run. Financial market development and inflation have uni-directional causality in the long run. Financial market development has a causal effect on inflation which implies that an improvement in the financial markets affects inflation, while the reverse does not hold true as we also found that inflation does not granger causes financial market development. These results can be related to the studies of Pradhan, Arvin, Samadhan and Taneja (2013) who used a panel granger causality test to determine the long run and causality between financial market development and inflation in 16 Asian countries. Pradhan *et al*. (2013) found that no causality from inflation to financial market development. Pradhan *et al*. (2013) further identified that financial development causes

inflation only in some countries in their study. Pradhan *et al*.'s (2013) results indicated that causality patterns differ across countries. The results from our study do not show any causality between institutional quality and inflation in the long run, which implies that the relationship between them is insignificant.

We also considered the relationship between financial market development and institutional quality in the presence of lending rates. The results showed that there is uni-directional causality between financial market development and institutional quality in the long run. Financial market development granger causes institutional quality, but institutional quality does not have any causal effect on financial market development. There is bi-directional relationship between financial market development and the lending rate in the long run. Higher lending rates are many times considered as a distress to financial markets and tend to slow down financial market development. Zilkhibri (2013) found causality running from lending rate to financial market development as lending rates negatively affect financial market development. On the other hand, the development in financial markets causes borrowing to be less expensive therefore, investors spend more. A bi-directional relationship thus exists between institutional quality and lending rates in the long run. The direction of causality of institutional quality to the lending rate is supported by Beck, Demirguc-Kunt and Levine (2006) who argued that the control of banks encourages low information cost and boost the integrity of the banking sector, mainly in countries with effective legal institutions, with positive influence on banking lending rates.

The results above also show the relationship between financial market development and institutional quality in the presence of economic growth. Uni-directional relationship is found between financial market development and institutional quality where financial market development causes institutional quality in the long run. The results indicate that there is no causal effect between financial market development and economic growth in the long run relationship. Makoni and Marozva (2018) found no causality between financial market development and GDP growth for Mauritius over the period of 1989 to 2016, therefore confirming that these variables develop independently of each other.

However, there is a bi-directional causality between institutional quality and economic growth, and these relationships are positive and highly statistically significant at the 0.1% level. Karimi and Daiari (2017) investigated causality between institutional quality and economic growth and found a bi-directional relationship between the two variables. Karimi and Daiari (2017) specifically found that the more under-developed a country is, the greater the impact of institutional quality on its domestic financial market development.

Table 4.35: Summary of granger causality test results

In the presence of infrastructure		
Dependent variable	Independent variable	Direction of causality
FMD	Institutional quality	
FMD	Infrastructure	
In the presence of inflation		
FMD	Institutional quality	
FMD	Inflation	
In the presence of lending rate		
FMD	Institutional quality	
FMD	Lending rate	
In the presence of economic growth		
FMD	Institutional quality	
FMD	Economic growth	No causality
Economic growth	Institutional quality	
Economic growth	FMD	No causality

4.3 Chapter summary and conclusion

This chapter presented the results of the estimation techniques that were employed in this study. The main objective of the study was to identify the drivers of financial market development of a sample of African countries. The study found that financial market development in the sampled countries was determined by institutional quality, economic growth, inflation and infrastructural development. With regard to our second objective, we

found that institutional quality granger causes financial market development. Lastly, financial market development has a positive but insignificant effect on economic growth, while only institutional quality has a positive and significant impact on economic growth.

The next chapter concludes the study by providing an overview of the key research findings, and recommendations thereof.

Chapter 5: Conclusion and Recommendations

5.1 Introduction

The purpose of this chapter is to give a summary of the key findings, offer recommendations based on the results of the African countries analysed in the previous chapter, as well as make suggestions for areas of further research.

5.2 Motivation and aim of the study

The primary objective of this study was to determine the main drivers of financial market development. The study also sought to assess causality between financial market development and institutional quality, as well as examining the effects of financial market development and institutional quality on economic growth in selected Africa countries.

5.3 Summary of key findings

5.3.1 Objective One: Drivers of financial market development

The first objective of the study sought to determine the drivers of financial market development in our sample of African countries. Based on the estimation results for the financial market development index, the study has evidenced that institutional quality, infrastructure development, economic growth, and inflation are statistically important determinants of financial market development in the selected African countries. We further constructed an index of institutional quality from the six individual institutional indicators of voice and accountability, regulatory quality, rule of law, control of corruption, government effectiveness and political stability. The study established a positive and highly significant effect of institutional quality on the composite financial market development index in the sampled African countries, thus confirming the importance of institutional quality in spurring financial market development.

5.3.2 Objective Two: Causality between financial market development and institutional quality

The study used the Granger causality test to check for causality, as well as the direction of causality between variables. Causality between institutional quality and financial market development was tested under different scenarios. In the first scenario, the causality was tested between institutional quality and financial market development in the presence of infrastructural development. Bi-directional Granger causality was found between institutional quality and financial development; thus, these two variables mutually reinforce each other. In the presence of inflation, the results confirmed a uni-directional granger causality between financial market development and institutional quality, with the direction of causality running from financial market development to institutional quality.

Furthermore, the causality between financial market development and institutional quality was also tested in the presence of lending rate. The study found uni-directional Granger causality flowing from financial market development to institutional quality. Lastly, there was evidence of causality between financial market development and institutional quality when tested in the presence of economic growth. We found uni-directional granger causality between financial market development and institutional quality, confirming that financial market development is a significant causal factor for institutional quality.

5.3.3 Objective Three: Effects of financial market development and institutional quality on economic growth

In this study, we examined the effects of financial market development and institutional quality on economic growth in South Africa, Botswana, Nigeria, Namibia, Cameroon, Morocco, Mauritius, Kenya, Egypt and Ghana. Regarding the effects of financial market development on economic growth, our findings are not consistent with the general studies analysing the finance-growth nexus in developed countries. Our results show that financial market development has no effect on economic growth in the sampled African countries under study. This can be explained by the high degree of corruption or the 2008 global economic and financial crises which indirectly effected the banking markets by reducing the liquidity and tightening of credit markets in the African region. In addition,

the African countries are dominated by the banking sector, while stock markets are still under-developed, shallow and almost non-existent in some countries. These are amongst the reason why financial markets are irrelevant in influencing economic growth in selected African countries under study.

We further assessed the impact of institutional quality on economic growth in the selected African countries. The study employed the control of corruption, government effectiveness, rule of law, regulatory quality, voice and accountability and political stability as institutional quality indicators. Although African countries are characterised by poor institutional quality, our findings show that institutions have a positive and highly significant effect on economic growth in the long run. This confirms that African countries are making progress with significant improvements in the institutional environment.

5.4 Policy implications and recommendations

African countries are still developing economies functioning below its potential capacity. The countries under study have not yet completely exploited their potential. However, they need to commit themselves into various institutional reforms that will not only contribute towards improving the level of financial market development, but may be able to assist the countries to entice foreign investors, which would result in a positive impact on productivity and eventually, economic growth.

African countries are subjected to a diverse range of constraints such as a weak knowledge base of institutional setup that did not support processes of learning, scarcity of financial resources and cultural forces, which cause a gradual improvement in institutional quality. Therefore, it is greatly significant for policy-makers to know which institutional factors are fundamental for financial market development. In addition, the policy drive of governments should be designed towards financial and institutional development, and this can be possibly achieved by effective enforcement of law to encourage compliance.

5.5 Suggestions for future studies

Firstly, the study only focused on ten African countries, which are considered to be the biggest economies in Africa. The generalisation of results to the marginalised countries in this study becomes difficult, especially in countries with smaller economies. Therefore, the future studies should extend this study to include more African countries and this can be done with the availability of data in other African countries which agencies need to improve. Secondly, the study did not include all players in the financial markets like money, bond, foreign exchange and derivatives markets. As such, a further study is recommended to include these other financial markets to gain insight as to how they could be impacted on by institutional quality. The researcher also recommends that future research should be directed on how institutional quality moderates the relationship between financial market development and economic growth.

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